UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF NEW YORK

ROBERT A. FALISE, et al., Plaintiffs, vs. THE AMERICAN TOBACCO COMPANY, et al., Defendants.	No. 97 CV 7640 (JBW)

COPY

DEPOSITION OF WILLIAM E. WECKER, Ph.D.

San Francisco, California

Wednesday, December 13, 2000

Reported by:
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UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF NEW YORK

ROBERT A. FALISE, et al.,	)
Plaintiffs,	)
vs.	) No. 97 CV 7640 (JBW)
THE AMERICAN TOBACCO COMPANY, et al.,	)
Defendants.	)

Deposition of WILLIAM E. WECKER, Ph.D., taken on behalf of Plaintiffs, at 400 Sansome Street, Second Floor, San Francisco, California, beginning at 2:15 p.m. and ending at 8:45 p.m., on Wednesday, December 13, 2000, before GINA GLANTZ, Certified Shorthand Reporter No. 9795.

APPEARANCES:

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EXHIBITS

* Retained by the witness.
** Originals retained by the witness.

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EXHIBITS

San Francisco, California, Wednesday, December 13, 2000

2:15 p.m. - 8:45 p.m.

THE VIDEOGRAPHER: Good afternoon. Here begins Videotape No. 1, Volume 1, in the deposition of William Wecker, in the matter of Falise versus American Tobacco, in the U.S. District Court, Eastern District of New York, the case number of which is 97 CV 7640 (JBW). Today's date is 12-13-2000. The time on the monitor is 2:16 p.m.

This deposition is being taken at 400 Sansome Street, on the second floor, in San Francisco California. The videographer is Paul Husome, employed by Esquire Deposition Services, located at 505 Sansome Street, Suite 502, in San Francisco, California.

Would counsel present and also present on the video teleconference please identify yourselves and state whom you represent.

MR. MINTON: Michael Minton, I'm with the firm of Thompson Coburn, and I represent Lorillard Tobacco Company.

MR. CHANG: Michael Chang, I'm a paralegal with Orrick, Herrington & Sutcliffe.

MR. FORESTA: In New York, this is Stephen

Foresta from the firm of Orrick Herrington & Sutcliffe. I represent the Falise plaintiffs in this matter.

MR. BURTON: Dal Burton, with Womble Carlyle. I represent R.J. Reynolds Tobacco Company.

MR. UGARTE: Richard Ugarte, from Winston & Strawn, representing Philip Morris.

MR. FORESTA: Anyone else?

EXAMINATION

BY MR. FORESTA:

Q All right. Sir, could you please state your full name for the record.

THE REPORTER: I need to swear the witness.

THE VIDEOGRAPHER: Thank you. Would the court reporter please swear in the witness.

WILLIAM E. WECKER, Ph.D.,

having been first duly sworn, was examined and testified as follows:

THE REPORTER: Go ahead.

THE WITNESS: William E. Wecker.

BY MR. FORESTA:

Q Thank you. And what is your address, sir?

A 505 San Marin Drive in Novato, California.

Q Is that a home address or business address?

A That's a business address.

Q Dr. Wecker, present in San Francisco with you is a legal assistant from our firm by the name of Michael Chang. What I'm going to try and do is have -- coordinate with Mr. Chang in presenting you with some deposition exhibits. Hopefully this will work out, but in the event that we have some glitches, please bear with us.

First thing I'd like to do is have Mr. Chang give to the court reporter the "Report of William E. Wecker, Ph.D., in Response to Dr. Cummings's September 22, 2000 Supplemental Report," and have that marked as Exhibit 1 by the court reporter, please.

(Deposition Exhibit 1 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q Can you identify the document for the record, please.

A This is my report, as described in the caption, in this case.

Q Thank you. I know that you've been deposed before in this litigation, Dr. Wecker, but the purpose of today's deposition is to question you with respect to

any opinions that you formulated as set forth in this supplemental report. Do you understand that?

A Yes.

Q All right. Did you prepare this report marked as Exhibit No. 1?

A Yes.

Q Did you have any assistance in preparing the report?

A Are you -- is your question limited to the document or do you intend to include the work that the document describes?

Q I want to start first with the paper report, the document itself.

A Well, I can tell you that I wrote the document, and I did it on my own word processor, and I believe I actually punched the print key, but since there were some other people involved, I -- I can just give you that best recollection. The words are mine. I typed them in with my fingers. Is that close enough?

Q When you say "other people" were involved, you're not including people involved in the actual drafting of this report; is that correct?

A If by that you mean the words on the page here as opposed to the work product, then I will tell you

that those are my words and no one else's.

Q Okay. Dr. Wecker, were you asked by counsel to prepare this report?

A Yes.

Q And which counsel?

A I think it was Mr. Leibenstein.

Q When were you asked to prepare this report?

A I can tell you, when Mr. Leibenstein called and either he said that a report would be involved or I took it for granted at that time, the date of that call was November 14th.

Q Did you begin the process of preparing this report on November 14th?

A No, the actual report writing came later.

Q Fair enough. At the time that Mr. Leibenstein called you to discuss the preparation of this report, did you have Dr. Cummings' September 22nd, 2000 supplemental report in your possession?

A Just a moment while I check something. I was checking to refresh my recollection, and what I'm recalling now, by looking at the actual document, is that the Cummings report is dated September 22nd, and I believe I received that report very close to September 22nd.

Q Who did you receive it from?

A I'm not sure. It would come in, probably, a Federal Express envelope, but I didn't open the envelope. I take it it came from counsel, but I didn't actually receive the envelope.

Q Somebody else in your office would have opened it?

A Yes, a clerical person; one of a couple who would deal with our incoming mail would have opened it.

Q Do you recall the first time that you saw this Cummings supplemental report?

A I can't give you a sharp date. I believe it was shortly after September 22nd.

Q Did the Cummings supplemental report come with a cover letter describing what it was?

A There were some other materials that came. I don't remember -- there could well have been a cover letter, but I don't have any recollection of one, but there were probably 6 or 8 inches of other materials that came. I don't remember if they all came at the same time or in batches. That's -- and I didn't bring them with me, so I can't do much better on that.

Q Can you describe what the other materials were that were provided to you?

A Mainly materials relating to the COMMIT work, documentation and research-type materials as opposed to lawyer-type materials.

Q You said that the packet of material was about 6 inches thick?

A That's my recollection. I'm sorry I didn't bring them. I just assumed that you would know about that, but if you -- if you want, during a break, I can call and get an inventory of that package. I just didn't bring it because I didn't think I needed to.

Q I'd like to do that, unless I can get an answer from counsel that obviates the need for that. But we don't have to take care of that right now.

A Okay. I'll wait for you to ask on that, then.

MR. UGARTE: Frank, for the record --

MR. FORESTA: Steve.

MR. UGARTE: Steve, I'm sorry. Steve, I can explain for the record, if you'd like.

MR. FORESTA: Please.

MR. UGARTE: The materials that Dr. Wecker is referring to are more than likely the reliance materials that were submitted to us by Michael Stolper after the report was written, to the best of my recollection.

MR. FORESTA: Okay. Thank you.

Q Did this initial communication, which included the Dr. Cummings supplemental report, include any instructions or directions on what you should do with it?

A No.

Q First time you had a communication with counsel for the tobacco companies on this matter was, I believe you said, on November 14th; is that correct?

A That's what I jotted down here. That was my recollection of that date. I've written it on my report here, because I thought you might ask me that, so that date I'm pretty sure of. I'm not sure of the exact date those other materials arrived.

Q Why don't you tell me, Dr. Wecker, what you did in response to the phone call from Mr. Leibenstein in preparing this report. And now I'm referring more broadly to any work product that you did in connection with this assignment.

A Sure.

MR. MINTON: Object to the form of the question

THE WITNESS: What I did is review the Cummings report, and -- I actually looked, sometimes only briefly, at everything I received, but I'm going to pick on the things that I paid the most attention to. The

Cummings report I think I already had, or possibly they came again in the stack. But I know I already had in my possession, from earlier work, the two articles that I've brought here with me, which I will refer to, if it's all right, as the 1995 COMMIT article and the 1997 COMMIT article. Would you like me to give the titles of those?

BY MR. FORESTA:

Q Yes, sir.

A Okay, the 1995 one is from Journal -- the American Journal of Public Health. And the title is "Community Intervention Trial for Smoking Cessation (COMMIT)," and then it has a Roman numeral I and says, "Cohort Results From a Four-Year Community Intervention." That's dated February of 1995. And that's the one I mean when I refer to the 1995 article. And the 1997 article has the title "Predictors of Smoking Cessation in a Cohort of Adult Smokers followed for Five Years." And it's in a journal called Tobacco Control. Is that enough description?

Q Yes, it is. Do you have any opposition, sir, to having us mark those two reports as exhibits for this deposition?

A No, you're welcome to them. You want me to

have the court reporter do that now or we'll do it later or what?

Q We have copies ourselves, but if it's not a problem for you, I'd prefer to mark that version.

A Okay. So you want me to just -- since you're at a distance there, I'll try to help out on this end.

Q Please do. If you could take the '95 report, and we'll have the court reporter mark that as Exhibit 2.

MR. UGARTE: For the record, I would ask just to make sure that those are clean copies of the articles, and complete copies, since I don't have the benefit of looking at the articles.

THE WITNESS: They're not clean copies. I've got a couple notes and arrows on them. And I believe they're complete, but I can give you the page numbers. The 9- --

BY MR. FORESTA:

Q Yeah, why don't you just tell us what the start page and the end page is.

A The 1995 article begins page 183 and ends 192. And the '97 article, I recall the page numbers are odd in this '97 article. I see no page number on the title page, and I have marked them myself because they're not

always legible. The last page -- I see one. It says S62, is the page number on the last page.

Q Okay.

A And the other pages begin with S. And they're sometimes marked in my own handwriting.

Q Those versions are as complete as the versions that I have here, and I see no reason why we shouldn't be entitled to a copy of a marked-up version that's in the doctor's possession. So I'd like to have you take those out and provide the '95 report to the court reporter to mark as Exhibit 2, and the '97 report to be marked as Exhibit 3.

MR. MINTON: What I'd like to do, Steve, is have an agreement that we can then substitute, at the conclusion of the deposition, a Xerox copy of the exhibit so that the doctor can have his originals back.

MR. FORESTA: Fair enough.

MR. MINTON: Okay.

(Deposition Exhibits 2 and 3 were marked for identification by the court reporter.)

THE WITNESS: Okay, we've done that.

BY MR. FORESTA:

Q Thank you, sir.

Now, I believe you said that you would have

read Dr. Cummings' supplemental report, and you would have read these two articles which you believe you may already have had in your possession.

What else did you do following Mr. Leibenstein's conversation with you in November of this year?

A Okay, I also reviewed Monograph 6, which you probably know by that name, it's a thick document. And I --

Q Doctor, before you continue, pardon the interruption, do you have the full copy of the Monograph No. 6?

A Well, I think so. It begins with a title page that says "Monograph 6," and my last page is -- well, my last page looks like some kind of a computer-type thing. It says the letters HV, "Community based 5740," and so on. I'm not sure what that's all about. But then the last substantive page is 252.

MR. FORESTA: Okay. Again, I'd like to have that document handed to the court reporter to be marked as Exhibit No. 4. We can make a photocopy of that and provide you with the original back at the end of the deposition.

MR. MINTON: All right.

(Deposition Exhibit 4 was marked for identification by the court reporter.)

THE WITNESS: Let me look, and if I have no marks here, you might not need it to be copied. Let me just look for a second. I see no notations on this of mine. Somebody else has written this letter "HV 7406" -- sorry, "C 737 1995 C2," but that's not my handwriting, it came that way. So if you're comfortable, so that we don't have to copy this thick thing, you may actually have a copy of this, and we don't need to do it. How's that?

BY MR. FORESTA:

Q I have the actual book. I don't know if you can see this. I have a photocopy. We don't need another one for the record, if counsel doesn't have a problem with that. And on your representation that there aren't any markups on the version that you considered and you reviewed, we'll just work off of what we have.

MR. MINTON: Would you like Mr. Chang to have a quick look at it?

MR. FORESTA: You know what? He doesn't need to do that. I'll take the doctor's word for it.

MR. MINTON: All right.

BY MR. FORESTA:

Q All right, please continue with a description of what you did subsequent to the phone call from Mr. Leibenstein.

A Well, I've indicated the paper documents that I paid the most attention to, and then there were two computer CDs with data, and I downloaded that data from the CDs, and just for a name to call all that data, we'll call that the COMMIT data, because it's data that comes from that study. Then I analyzed that data, and I think that sums it up. Then I wrote up what I found in this very brief report.

Q Getting back for a second to the computer data that you received, you received that from counsel for the tobacco companies?

A I assume so. That's -- I would normally expect to get everything by way of counsel. But my understanding is that it's material that came from Dr. Cummings indirectly.

Q That's fine.

A Indirectly through counsel.

Q Excuse me. I just wanted to make sure that this wasn't information that you also previously had possession of.

A You are correct. This came recently in the -- from counsel indirectly. My understanding was it was provided by Cummings. And I got it for the very first time. I have never been able to get my hands on COMMIT data prior to this matter.

Q Okay. And obviously, prior to this matter, you haven't had an opportunity to analyze the COMMIT data; correct?

A That's correct, I have not had it.

Q All right. What did you do after you analyzed the data, sir?

A Well, then I think we're essentially up to the report-writing stage. This was a very compressed time period, so now we have a December 4th dated report by me, and I was writing on that a day or two before, and I simply describe what I did.

Q Who, if anyone, assisted you in the analysis of the data that was provided to you?

A Mr. Harvey. And then he had some other people that were assisting him, and since that's at a second level, I'm not as sure of who he was getting help from, but mainly I worked directly with Mr. Harvey.

Q For the record, who is Mr. Harvey?

A He's a gentleman that works at my firm.

Q First name?

A Gary. I believe it's R., the initial R., then Garrison Harvey. Goes by Gary.

Q All right. Did he do -- strike that question.

Did you do any of the analysis of the data or was that done by Mr. Harvey and people working at Mr. Harvey's direction?

A They were all working at my direction, and I -- they would -- he -- and sometimes he would bring other folks that were helping him to my office, and we would discuss what to do, and then normally I'd have him go off and do it, or maybe he would assign bits of the work to other people and then come back with results.

Q Did you ever do the actual computations, the statistical computations yourself?

A I did some of my own, but mainly the larger computer runs were done by other people. This was a very compressed time period, so we probably had -- I think there was as many as four people that were working on this at the same time.

Q Okay. Dr. Wecker, I noticed from the screen that you brought some materials with you here today?

A Yes, I've -- those are the ones that I mentioned as I was going through them.

Q Okay. Tell me again what it is that you brought with you here today.

A I've got my report, I've got the Cummings report, I've got the two articles, '95 and '97, I've got the Monograph 6, and the one I didn't mention is that I have the computer printout that -- I would call it my work papers that were disclosed to you, I don't know the exact date, but a few days ago. They would -- I think they would have been disclosed in computer form, but I have some printouts here of those.

MR. FORESTA: Okay. Mike, does it make sense to put an exhibit tab, an exhibit sticker on that binder, and maybe we can get a photocopy of the contents of the binder during a break?

MR. MINTON: Yes.

MR. FORESTA: Okay. Madam Court Reporter, could you put a sticker on the cover of that binder, please.

(Discussion off the record.)

THE REPORTER: Is this on the record?

MR. FORESTA: Let's go off the record, please.

THE VIDEOGRAPHER: The time is 2:40. We're going off the videotaped record.

(Discussion off the record.)

(Deposition Exhibit 5 was marked for identification by the court reporter.)

THE VIDEOGRAPHER: The time is 2:41. We're back on the videotaped record.

BY MR. FORESTA:

Q Dr. Wecker, can you tell me all of the materials that you considered in preparing your report, which has been marked as Exhibit 1 for this deposition?

MR. MINTON: Object to the form.

THE WITNESS: Well, I'm -- let me first incorporate, by reference, the materials that are cited in my report, rather than trying to just read them all.

BY MR. FORESTA:

Q Well, let me just stop you there, because the version of your report that I have says, "Attachment A, additional materials considered." And there are two items listed. One, K. Michael Cummings, Expert Report, Falise, et al., v. The American Tobacco Company, et al., September 22, 2000." We've already discussed that; right, Dr. Wecker?

A Yes.

Q And the second item is "Data files collected from the COMMIT smoking cessation study." Have you -- those are the computer files that you received from

counsel; is that correct?

A Yes, the ones we've discussed.

Q Okay. In addition to the Cummings report and the data files that we've already discussed, what other materials did you consider in preparation of Exhibit No. 1?

A Okay, I'm going to -- I think the answer I started was going to be helpful. I can either take the time, if you want me to, or I can just tell you that throughout the report you'll find footnotes, 14 in total, and they mention various materials that I am referring to.

Q Right.

A And rather than just read them all, I would say those are things that I considered. And I was --

Q Fair enough.

A And I am going to take a moment to look here and see if there's anything else that comes to mind.

I mentioned earlier the stack of materials that I call the Cummings disclosures. I don't have them here, but I did look through them. I suppose it's fair to say I considered those. I'm -- just a moment, I'll continue here.

I looked at a summary description of the COMMIT

study that's in the 2000 surgeon general report. I can't point to the page, but there's about a two-page description in there that I read.

There's a document from the Centers for Disease Control that I looked at that talks about smoking cessation. I believe that's the title, at least the title of the section that I looked at, "Smoking Cessation," and that's where they review a number of different studies, including the COMMIT study. And I think that's it, although I'll mention that Section II of my report refers to Dr. Harris's work, but I didn't review that new for this work, I just already knew about it. I was referring back to it from earlier depositions.

Q Do you have the summary description of the COMMIT study that's contained in the 2000 surgeon general's report with you now?

A No, I don't.

Q Do you have the CDC document that you referenced with you now?

A No, I don't have that either.

Q Am I correct that neither one of those two documents is referenced as material that you considered in your report marked as Exhibit 1?

A That's correct. It's not mentioned. That's why I made sure to tell you.

Q I appreciate that, but were you aware that you were supposed to disclose in your expert report all of the materials that you considered in preparing this report?

MR. MINTON: Object to the form of the question.

THE WITNESS: I'm not sure what the rules are. I'm just telling you that I have read those other items.

BY MR. FORESTA:

Q Irrespective of what the rules are, did counsel tell you to disclose all of the materials that you considered in preparing this report?

MR. UGARTE: Objection.

THE WITNESS: I don't recall a specific conversation. Obviously I have an attachment here that indicates other materials considered, and that's -- those were the ones that I had in mind on December 4th, but, nonetheless, I must tell you today that I have looked at those other things. Whether I wrote it down or not, I have looked at them.

BY MR. FORESTA:

Q Well, you haven't written them down, we know

that; right, Dr. Wecker?

A They're not on my December 4 appendix list, right.

Q And you did consider them in preparing this report; correct?

A Actually, I looked at them after December 4, so they weren't part of my pre-December 4 consideration, but I've looked at them.

Q What other materials, if any, did you look at after the preparation of this report on December 4?

MR. UGARTE: Objection. Vague and ambiguous.

THE WITNESS: I'm thinking. Just a minute. I can't think of any others, but if one comes to mind later, I'll try to tell you about it.

MR. FORESTA: Counsel, can you see to it that we get a copy of the CDC document that Dr. Wecker is referring to?

MR. MINTON: Yeah, we'll produce that to you.

MR. FORESTA: I don't think there's any need to produce the 2000 surgeon general's report.

MR. MINTON: Okay.

BY MR. FORESTA:

Q Dr. Wecker, there's nothing else that you can recall, as you sit here now, that you considered in

preparing this report other than the materials you've already referenced; is that correct?

A Well, I'm thinking. I hope I don't miss something. Just a minute.

I can't think of anything else. I've referred to everything that comes to mind.

Q Does your consideration of the CDC document and the surgeon general's report from the year 2000 affect in any way the opinions that are set forth in Exhibit 1?

A The material that was descriptive in the 2000 surgeon general report, I would say -- I'd put it in the category of background with no direct connection to any opinion, just a description of the study. The CDC document actually led me to do a calculation, which we sent to you only recently, and which I have here in my notebook of computer materials, under --

Q What calculation -- I'm sorry.

A I have it here. Go ahead. You want me to finish this?

Q Could you please finish your answer, sir.

A Okay. -- in my notebook of materials, under a tab 74. I mention the tab number because I believe the organization of the materials that we sent on to you, even though in computer form, was organized by -- with

that same kind of indexing, so that might help you find it.

Q All right. Well, we're going to get to the computer information that was provided to us in a few minutes, but let's set aside, for the time being, that reference to tab 74, but if you can just tell me what that calculation is that you ran following your review of the CDC document.

A It's a calculation of quit rates.

Q Based on what information?

A The COMMIT data.

Q Hadn't you already done that prior to December 4th, Dr. Wecker?

A I've done a number of calculations of quit rates, but not this one.

Q What's different about this quit rate calculation than the ones that you did before?

A Well, this one is done the way the CDC recommends.

Q When did you perform this calculation, sir?

A I'd say it was early yesterday. I may be off by a few hours, but . . .

Q Why did you do this, Dr. Wecker?

A Because, I -- well, for two reasons. First, I

had been -- I had noted all along that the COMMIT calculation of quit rates appeared to ignore what I'll call nonresponders. And when I thought about that later, I happened to be talking to a colleague about a completely different matter having nothing to do with litigation, and asked if he knew how other people handled that, and he directed me to the CDC document, which I then reviewed and did the calculation their way.

Q When you say "how other people handled it," what are you referring to?

A The calculation of quit rates as done in the, let's say the 1995 article, when there are nonresponders.

Q What do you mean by "nonresponders," Dr. Wecker?

A I mean that in this context, when individuals were contacted or contact was attempted, in 1993, after the intervention period, if the individuals could not be located or chose not to speak to the interviewers or otherwise would not give them information on whether they had quit smoking or whether they had continued, that group I'm calling nonresponders, because that's a conventional term and statistical talk.

Q And it's your testimony, Dr. Wecker, that the

'95 study appears to ignore nonresponders; is that correct?

A Yes. Well, they mention them, but they -- when it comes to the calculation, that's what happens, yes.

Q In any of your calculations prior to yesterday, did you take into account the missing data from the 1995 study?

MR. MINTON: Object to the form of the question.

MR. UGARTE: Object.

THE WITNESS: I'd have to look through my entire set of calculations, but -- and I'll do that if you ask me to, but I can give you a quick recollection that I hope will be accurate and saves time. I believe that whenever I had missing data in the various calculations, I set that data aside in the same fashion that Dr. Cummings did when he did his calculations.

As we're going through -- I assume you'll ask me specifics about these other items; if we go through them, I see that there's a place where that was done differently, I'll remember and I'll tell you.

BY MR. FORESTA:

Q As always, Doctor, if there ever comes a time when you recall something that changes a previous

answer, please feel free to do so.

When did you first become aware that there were nonresponders in the COMMIT study?

MR. UGARTE: Object to the form.

THE WITNESS: First time I -- well, I would have assumed it going in, but the first time I became aware of it was when I read about it in the 1995 article describing the study.

BY MR. FORESTA:

Q In what way does the method of calculating quit rates for the COMMIT study set forth in the CDC paper differ from the methods set forth in the '95 study, the actual article, which we marked as Exhibit No. 2?

A The essential difference is that it is in the denominator of the quit rate calculation, where, in the '95 article, the number in the denominator would be composed of the number of individuals who reported quitting, plus the number of individuals who were contacted and reported continuing smoking; whereas, the CDC recommendation is to include, in addition, the number of individuals who were in the study but were non -- not able to be contacted at the '93 follow-up.

Q Again, it's your opinion that the '95 study does not take into account information relating to the

nonresponders; correct?

A Well, they -- it's -- it is certainly mentioned, but when it comes to the calculation of quit rates, it's as if those numbers are simply set aside, they simply don't figure into the calculation.

Q They're not imputed into the calculations in any way?

MR. UGARTE: Objection.

BY MR. FORESTA:

Q Did you hear the question, sir?

A I didn't hear a full question.

Q They're not imputed into the calculations of quit rates in any way in the '95 studies?

A Well, that would almost be a semantic debate. I think the -- there's a discussion of imputations, and I certainly read it, that the plain fact of how the calculation is done is that the individuals who were not contacted are simply ignored. Anything that comes after that in the way of imputation discussion is simply a matter of trying to justify doing it that way, but it doesn't change the fact that that's how the calculation was done.

I wonder if you'll permit me, and we'll just leave the tape running for time, to just reach back and

get a glass of water.

Q Oh, certainly.

A Just one second.

Q Don't forget the mike.

A Okay, thank you. Okay. Ready.

Q All right, Dr. Wecker, did counsel request that you run new calculations based on the CDC information?

A No, that was just my idea.

Q Okay. When did you first communicate to counsel that you had done these new calculations?

A I think it was within a matter of an hour before sending them to you, so it would have been, I think, yesterday sometime.

Q Who did you communicate this back to?

A I'm not sure. I was in a meeting, and I asked Mr. Harvey to call, and so I'm not sure who actually got on the phone.

Q This meeting that you were in, did it have to do with the Falise matter, the Falise case?

A No, no. I had a long-scheduled meeting with other people yesterday, and so I had to try to do two things at once yesterday. The meeting had nothing to do with this matter.

Q Okay. Did you meet with counsel prior to the

deposition today, about this deposition?

A This morning or late this morning, not yesterday, because I was busy with another thing, but when I drove here this morning around -- around 11 o'clock, I met with Mr. Minton, and we had lunch and then we came over here.

Q All right. Are you aware, Dr. Wecker, that Dr. Cummings was deposed in this matter on December 1st?

A I don't recall the date, but I am aware he was deposed.

Q Have you seen or reviewed the transcript from that deposition?

A Yes. And you have just named another document that I had forgotten. I have reviewed that deposition, although --

Q Well, did you --

A Excuse me. I reviewed it. I haven't read every page, but I spent some time looking at it.

Q Did you review that transcript prior to preparing your report marked as Exhibit 1?

A I'm not sure of that. I don't remember what date I got it, so I'm not sure when I first saw it.

Q All right. And you don't disclose that as a material that you considered in preparing this report,

do you?

A No, and that suggests that I might not have received it by that time.

Q All right. And did you receive any exhibits that were marked at Dr. Cummings' deposition in December of this year?

A Well, I'm not sure what was marked as an exhibit. I have that other stack of materials that I'm calling the disclosure materials. Whether those were marked or not, I'm not sure. I didn't pay attention to whether the stack of materials had exhibit stickers on them.

Q All right. Just to draw the distinction, when you received the transcript, presumably within the last two weeks, did you receive any exhibits or any documents along with the transcript that purport to be exhibits marked at the deposition?

A Well, not that I'm aware of. Perhaps I'm mixing them up, but the deposition that I looked at, I believe was sent by electronic e-mail, and I just printed it, so if the other --

Q Okay.

A -- if there were some other materials, I haven't associated them with the deposition.

Q Did you discuss the Cummings deposition with counsel for the tobacco companies?

A Today I did, yes.

Q During your session this morning or early this afternoon with Mr. Minton?

A Yes.

Q Prior to that time, had you discussed the Cummings deposition with counsel?

A No.

Q Had you reviewed the Cummings deposition transcript prior to running these new calculations based on the CDC document?

A Yes.

Q Did the -- did your review of the Cummings deposition transcript cause you to run these new calculations?

A No.

MR. FORESTA: All right. Michael Chang, if you're there, if you could take the December 12th, 2000 letter from Ricardo Ugarte to Chad Marlow and hand that to the court reporter to be marked as our next exhibit, please.

(Deposition Exhibit 6 was marked for identification by the court reporter.)

THE WITNESS: Do you know if this thing receives regular TV signals?

MR. CHANG: I have no idea.

THE WITNESS: Well, at a break, find out so we can watch the thing at 6 o'clock.

BY MR. FORESTA:

Q Dr. Wecker, do you have the document that's been marked as Exhibit 6?

A Yes, I do.

Q Okay. Just so we're working on the same page, literally, is this a one-page document on Winston & Strawn letterhead?

A Yes.

Q Okay. I will represent to you, Dr. Wecker, that this document, which is a letter from Mr. Ugarte to an associate of mine, Chad Marlow, and says, "Dear Chad: In connection with Dr. Wecker's upcoming testimony, attached please find a disk containing COMMIT reliance data," I will represent to you, sir, that this document and the accompanying disk were received in our offices sometime late yesterday afternoon/early yesterday evening. Recognizing that you didn't prepare this letter, do you, nevertheless, have any understanding as to what was contained on the disk that was referred to

by Mr. Ugarte as COMMIT reliance data?

MR. MINTON: Object to the form.

THE WITNESS: I can take a guess, that it was the material in my tab 74 and 75. If you -- if the disk had a directory and if the directory structure is the way I think it is, it probably has tab numbers on it.

BY MR. FORESTA:

Q Well, I have in front of me a print screen that I believe is the directory from the floppy disk that was sent to us, and it doesn't make any reference to tabs. There are four files listed here, the first of which is an LST file entitled "diff18a"; do you recognize that title?

A Yes.

Q The next one is a SAS file entitled "diff18a.sas."

A Yes.

Q Do you recognize that?

A Yes.

Q The third file is an LST file entitled "89eval"; do you recognize that?

A Yes.

Q And the last of the four files that were provided to us yesterday is another SAS file, this one

is entitled "89eval.sas." Do you recognize that one?

A Yes.

Q Is this the information, the computerized information that you provided to counsel yesterday?

A Yes.

Q Can you just summarize for the record what this information constitutes or represents?

A Sure. The -- there's two things here. The dot LST files are the output and the dot SAS files are the computer program that will create the output, so I'll refer to two things rather than four things.

Q Fine.

A The first one is the calculation of the quit rates in accordance with the CDC method, and then the second thing, which begins with the 89, is a tabulation of questionnaire results from the COMMIT data.

Q Did you say tabulation of questionnaire data?

A Yes, survey data.

Q Where did you get that information from, the information that went into the second calculation you just referred to?

A That's received from disclosures from your folks in this case. It's the -- came on the CDs.

Q That would have been included in the materials

you received in September of this year; correct?

MR. UGARTE: Objection.

THE WITNESS: I don't remember if it was September or not, but anyway, it was earlier this year.

BY MR. FORESTA:

Q But it's your understanding or your belief that this data was included on the CDs that were provided to you by counsel for the tobacco companies; correct?

MR. UGARTE: Object to the form.

THE WITNESS: Yes, I believe that's correct.

BY MR. FORESTA:

Q All right.

A I don't want to confuse you with that answer. This is the same CDs that I talked about earlier that I believe originated with Dr. Cummings. It's not a different set of data.

Q Okay. Maybe I shouldn't have assumed that, but I did.

A Okay, good. I just want to make sure.

MR. FORESTA: Michael Chang, can you take the two-page document that you should have there with a handwritten number 1 circled in the upper right-hand corner.

(Deposition Exhibit 7 was marked for

identification by the court reporter.)

MR. FORESTA: Can we have that marked as Exhibit 7, please.

THE REPORTER: It's done.

MR. FORESTA: Thank you. And has it been shown to Dr. Wecker?

THE WITNESS: Yes, I have it.

BY MR. FORESTA:

Q Okay. Can you please take a look at what's been marked as Exhibit No. 7, and I'll ask you, when you've had a chance to look it over, whether you recognize the document.

A I recognize it.

Q Can you identify for the record what this is?

A This is the file diff18a.lst.

Q And what does this represent? This is the output for the quit rate calculations that you ran according to the CDC document; is that correct?

A That's correct.

Q The top line on this document, Dr. Wecker, says "Quit ratios for lm smokers." Can you just identify for the record what "lm smokers" refers to?

A That's the nomenclature of the COMMIT study. The "lm" means the light/moderate smokers.

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Q Is this out- -- is this document a reflection of the output of only the nonresponders from the COMMIT study --

A No.

Q -- or does this include the entire population?

A It includes the people who responded and said they quit. It includes the people who responded and said they did not quit, and it includes the people who did not respond.

Q And is this the only calculation that you ran for this case that includes the full population, namely, those who quit and responded, those who didn't quit and responded, and those who didn't respond?

MR. MINTON: Object to the form.

THE WITNESS: Maybe when we go through here I'll spot something that I'll have to add to my answer, but when it comes to quit rates, in the -- of the kind that we're looking at here in Exhibit 7, I believe this is the only one that was done in this fashion. There are other calculations throughout my work where data from individuals is used, but it's really on a different subject. I don't think it's what you meant in your question. I think -- I understood you to mean when it comes to quit rates of this kind.

BY MR. FORESTA:

Q That's right. Those other studies, do they include data that relates to nonresponders in this study?

A Well, that's -- that's why I have to add some interpretation to your question. Rather than just make you rephrase it, I was trying to help.

The issue doesn't even come up, in the way I'm discussing it now, until 1993.

Q Correct.

A And there are some elements of data here that were taken from 1988 or '89, and they do figure in some of the work that I've done, but I think that's mixing together two things that you really didn't have in mind in your question, so I just wanted to put that as a footnote. So that's why I said when it comes to quit rates of the kind that we're looking at in Exhibit 7, I believe this is the only one of this kind.

Q I understand. Thank you for the clarification.

And just for the record, Dr. Wecker, the second heading on this -- on the first page of Exhibit 7 says "Quit ratios for h smokers." Could you just tell us what "h smokers" refers to?

A The "h" is for heavy.

Q And this is a, I believe you said nomenclature that was used in the COMMIT study --

A Yes.

Q -- to refer to heavy smokers; is that correct?

A That's correct.

Q Do you know what the criteria is for being classified as a heavy smoker under the COMMIT study?

A If you want to be sure, I could look it up, but my memory is it was 25 cigarettes a day, but I could be wrong about that. They tell us in the description, and if you want me to take the time, I could try to look that up.

Q That's fine. We're going to get into the description later on.

Michael Chang, could you please take the document that has a number 2 and it's circled on the right-hand -- upper right-hand corner of the first page, hand that to the court reporter, and we'll mark that as Exhibit 8, please.

(Deposition Exhibit 8 was marked for identification by the court reporter.)

THE REPORTER: It's marked.

MR. FORESTA: Could you hand it to Dr. Wecker, please.

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THE WITNESS: I've got it.

MR. FORESTA: Thank you.

MR. BURTON: Is this Exhibit 8?

MR. UGARTE: Yeah.

BY MR. FORESTA:

Q Do you recognize this document, Dr. Wecker?

A Yes.

Q Can you identify it for the record, please.

A This is the file that I sent to you that has the name diff18a.sas.

Q Is there any significance to the title "diff18a"?

A No, I didn't give it the title. One of the people helping me yesterday, when I was busy with other things, did. I have no idea why they picked that.

Q All right. Dr. Wecker, is this the program that you ran to come up with the output set forth in Exhibit 7?

A Right. You run Exhibit 8; you get Exhibit 7.

Q Did you run this program yourself, or did someone else run it for you?

A I had someone else do this while I was in another meeting, but I told them what to do.

Q And what data did you use in running this

program?

A This would be the -- I think the variable name is, I think, status 93 or something like that. It is the data that is collected by the COMMIT study people, in early 1993, when they call up and they ask the people that they've been following up during the four-year period what their final disposition was. I think -- I remember the variable name, I don't remember the lone file name.

Q Is this the entire data set from the COMMIT study?

A Oh, no, no, of course not. This is -- it's what I just told you it was.

Q Okay. This is information that you believe was provided by counsel for the plaintiffs in this case to counsel for the tobacco companies and then sent to you?

A Yes.

Q All right.

Michael, could you please mark the document that has a number 3 circled in the upper right-hand corner as Exhibit 9, please.

(Deposition Exhibit 9 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q Do you have a copy of what's been marked as Exhibit No. 9, Dr. Wecker?

A Yes, I do.

Q Have you had a chance to take a look at that, please.

A Yes, I've seen it.

Q Do you recognize that document?

A Yes.

Q Would you please tell us for the record what it is.

A It's -- let me just check the full document. One second.

It appears to be a printout of my file 89eval.lst.

Q And again, this is a file that you provided to counsel for the tobacco companies for the first time yesterday?

A That's right.

Q What does Exhibit 9 reflect? What's the information that's printed out here?

A It's just a tabulation of the questionnaire responses to one of the COMMIT questionnaire drafts, and the -- I've indicated question numbers, but if you'll permit me, I can suggest something here that might make

this easier to digest.

Q Please do, sir.

A Okay. First, you probably should print this out again with -- and do it landscape, because you've run the -- what is a single row, and it's wrapped around into double rows, and it's going to make it hard for you to read.

Q All right.

A And if you did that -- and then I have in Exhibit 5, in tab 75, following the material which is Exhibit 9, although I printed it out in a way that's easier to read, that I recommend -- following that, I have actually copied the questionnaires from the COMMIT documentation so that you can actually see what the questions are that I'm tabulating here.

Q Am I correct that the questions you're tabulating are questions numbered 23, 24, 26, 29, and 30?

A Yes.

Q What was your purpose in tabulating these questions?

A Counsel just asked me to do it, and it was easy to do, and I was glad to do it.

Q When you say "counsel," who are you referring

to?

A I didn't actually take the call, but I believe that it was Mr. Ugarte.

Q When was the request made?

A I could be wrong about who called. I didn't take the call, and so let me help with the timing question. It would have either been yesterday morning or maybe sometime late the day before.

Q And you had not run these tabulations prior to that point in time; isn't that correct, Dr. --

A That is true.

Q Did counsel -- strike that question.

THE REPORTER: This is the reporter. Can I ask whoever is objecting to look right into the camera, or raise your hand, I can't -- it's very hard to tell who is talking.

MR. FORESTA: I objected.

THE REPORTER: Who was "I"?

MR. FORESTA: I struck the question. Nobody objected.

THE REPORTER: Okay. Well, when you do. Thank you.

MR. FORESTA: Michael Chang, can you take the document that has the number 4 in handwriting, circled

in the upper right-hand corner, give that to the court reporter, please.

(Deposition Exhibit 10 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q Have you had a chance to look this over, Dr. Wecker?

A Yes, but just a moment. Okay.

Q Is there any better way to format this document?

A No, this is fine. You should have no trouble with this.

Q All right. Can you -- you recognize the document?

A Yes.

Q And can you identify it for the record, please.

A This is the file 89eval.sas.

Q And is this the program that you ran to do the tabulations requested by counsel?

A Yes.

Q And where did the data come from that you used in running this program?

A It came to me on those CDs that we talked about earlier.

Q And what were the results of the tabulations that you ran?

A That's Exhibit 7. I'm sorry, Exhibit 9.

Q Dr. Wecker, the electronic data that we received yesterday is the second set of electronic data that we received in this case. I'll represent that to you.

Have you provided, on two separate occasions, computerized data or electronic data to counsel for the tobacco companies?

A Are you referring to disclosures in earlier depositions? I'm not sure I follow you.

Q No, no. You raise a good point. My questions on this topic relate solely to any disclosures you would have made in the course of preparing your supplemental report, which has been marked as Exhibit 1.

On how many separate occasions did you provide electronic data to counsel for the tobacco companies?

A Well, I think that the materials that I have here as tab 65 through 73 should have gone to about the time of -- or perhaps even the same day as my report, which is dated December 4th. Now, that, plus the ones we've just been discussing, are all that I can think of that are involved in the work related to my December 4

report.

Q Just so we're -- you understand me, when I say "you," I would also include anybody acting on your behalf; all right?

A Sure.

Q Okay. Did you provide the electronic data -- the first set of electronic data to counsel for the tobacco companies along with your December 4th report?

MR. UGARTE: Objection.

BY MR. FORESTA:

Q In other words, did they go together from you to counsel for the tobacco companies?

A Probably not, but I remember signing, fairly late at night, the report of December 4th, but I -- I didn't actually see things go in a package, and so I don't know if there were computer materials in the package with this or whether they went separately. After I signed it, I handed it to somebody and I left.

Q Okay. You don't have any understanding that electronic data generated by you in the course of preparing your supplemental report was forwarded to counsel for the tobacco companies prior to completion of your report?

A It could have been, but I would expect it would

be around the same time.

MR. FORESTA: Michael Chang, can you take those series of print screens and provide them to the court reporter to be marked as Exhibit No. 11.

(Deposition Exhibit 11 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q Dr. Wecker, I'll represent to you that I had someone in our MIS department print out for me these pages, which I believe are graphical depictions of the directory contained in the first floppy disk provided to us by counsel for the tobacco companies.

A Okay.

Q Do you have reason to believe that's not what this is?

A Oh, I haven't looked at it completely, but it appears to have the directory structure that I'd expect, beginning with tab 65 and ending with tab 73, as I suggested to you a moment ago.

Q All right. There was also a readme file that was sent along --

A Yes.

Q -- with this data.

A I'm not sure what that says, I'd have to open

it.

Q Well, if you look at the third page of Exhibit 11, that's a printout of the readme file.

A Okay, just a moment. I'll read it.

Okay, I've read that.

Q I'm sorry, did you say you've read it over?

A Yes.

Q Do you know what that readme file is or what it relates to?

A Sure. It's trying to help you with the structure of the materials.

Q And does it refer to a conversion of data by you or by your office; is that what it's referring to?

A Format conversion, not a change of the data.

Q Sure. You took the data as you received it, and then reformatted it in some form that you could use?

A Well, I could use it in a lot of forms, but the form that we've used it in -- this particular tab, we used this utility called DBMS copy, which is the conventional thing to do, so that it would be acceptable input to a -- let's see, I guess this is a SAS format that we've got here. I'd have to look at it more closely.

Q Can you turn to the page that appears to refer

to the contents of the folder entitled "tab65."

A Which -- can you give me a number of page? First page?

Q The fifth page. Five. If you look in the upper left-hand corner, it should say "tab65."

A No, I don't get that. Okay, I got it now. Go ahead.

Q Can you tell me what's contained in the folder that's entitled "tab65"?

A Well, there's some files there, some of them are program files such as the second one, nqr3s_commit.do. That's an executable file. And basically these -- I'm not going to go through all of them, we'll drive the court reporter nuts here, but these basically are files that I've gotten printed out and have here in the tabs, in the paper version that I've brought here, so if I turn to tab 65, in my materials in Exhibit 5, I have the printed-out version, and the first thing I see here is nqr3s_commit.log. That's an execution version of the program that we -- that I mentioned just a moment ago.

Q What do the files in tab 65 relate to?

A The -- just a moment, I'll look here. This "nqr" nomenclature is a Dr. Harris nomenclature, so you

probably recognize that if you have been involved in that end of things here. And so what I've done here -- it probably would be helpful to find the section of my report that's referring to this. Why don't I just do that. Just a second.

Yes, the last sentence of the first paragraph of Section II where I end that sentence with a footnote 14 --

Q Yes.

A -- that footnote would direct you to this material, and when you come here, you'll find that this is where I found Dr. Harris's model. This particular thing, called a Cox proportional hazards model, C-o-x, when applied to the data from the COMMIT study, finds only a statistically insignificant quit rate of 1.04.

Q All right. And the program that you ran, and to reach that conclusion is contained behind tab 65 in binder -- Exhibit No. 5?

A Let me look and see if I printed it. Yes, the program file is there too, and it's also on your computer materials in Exhibit --

Q Would that be the SAS file?

A -- 11.

Yes. Let me make sure of that. I may have

more than one thing here. Just a second.

I think I did not print -- okay, this is a stata program, a particular kind of language. And the log file that I had printed here contains both programming information and output information in the same file. So I have here both programming and output information.

Q And those are printed out behind tab 65?

A Yes.

Q Footnote 14 of your report, Dr. Wecker, also makes reference to computer files in tabs 66 through 69 --

A Yes.

Q -- do you see that?

A Yes.

Q Are those calculations that you ran in addition to the calculations run in tab 65 to try to estimate the effect of smoking education from the COMMIT data, based on Dr. Harris's model, if you understood the question?

MR. MINTON: Object to the form.

THE WITNESS: I'll answer it. They are additional calculations that I've run, and they relate to the same topic, and they do make use of Dr. Harris's computer calculations, but they are a different Harris

program than the one we've just been talking about. The two subjects are very closely connected.

The tab 65 shows what I state at the place on page 4 of my report, that Harris's Cox proportional hazard model, when applied to the COMMIT data, shows essentially no differential quit rate. I'm just paraphrasing here to speed things along.

BY MR. FORESTA:

Q Okay.

A And then the natural companion to that is to look at the -- at calculations using Harris models in these other tabs, 66 through 69, to see what they look like when I change his very large quit rates or quit rate multipliers into essentially no difference. So it's all one thing, but it's easy to get them mixed up. I should tell you that there's -- tab 73 is a summary of 66 through 69; that's probably easier to digest if you need the -- if you'd like to bear that in mind.

Q Okay. Those are two Excel spreadsheets that you prepared?

A Yes, this tab 73 is, and it's an easier-to-view summary of 66 through 69.

Q What about 65, is there some other depiction of the results from the calculations you ran in tab 65?

A Well, the main part is just that single result at the bottom of the first page. But this program, which Dr. Harris wrote, continues on and does the same sort of calculation with some covariates being employed. That's on page 2. Essentially the same result, so there's not really a new opinion here.

Q I'm sorry, page 2 of your report?

A Page 2 of -- the second page of tab 65.

Q Okay.

A The nqr3 is a fairly long program, doing more than one thing. So it gets this result I cite on page 4 of my report, and then it doesn't stop. It keeps -- the program does more than one thing. It does it all over again with some covariates. And the way I've printed it out in Exhibit 5, it happens to be the second page, and I've numbered the pages. So it's tab 65, page 2, where it does that, and it keeps right on going and slips into something called a Gompertz, G-o-m-p-e-r-t-z, calculation.

Again, this is not my introduction of this concept. This was there in the code as I got it from Dr. Harris, and so I just keep right on -- the program keeps right on going and it calculates this Gompertz material that, as far as I know, Dr. Harris is not

referring to, but maybe he is, I'm not sure. And then it prints a picture of -- the picture in the back is the Gompertz picture, on the fourth page, and then it quits.

Q All right. If I understand what you're saying, Dr. Wecker, tabs 66 through 72 are simply application of the COMMIT data to other Harris models that he ran --

A I'd say --

Q -- is that --

A I'd say application of the finding from the study of the COMMIT data -- well, the finding of the COMMIT study, or my particular calculation in tab 65. Then I do the next logical step, which is to apply that finding to the port -- the programs that Dr. Harris uses to do further calculations where those numbers are inputs.

Q All right. We've been going for an hour. If we go another five minutes, we can take a break, because I'm going to be changing subjects, but I have a few more questions on some of the computer --

A Sure.

Q -- files.

A A break is fine, and let's plan for a break at 9 o'clock your time so we can watch the news.

Q Okay. It will be short.

MR. MINTON: The news?

MR. FORESTA: Speech.

THE WITNESS: Okay, break. He said break.

MR. MINTON: No, he said he wants to keep going for a couple --

BY MR. FORESTA:

Q I want to get a few more of the computer files identified, Dr. Wecker, and then take a break.

A Sorry; I misunderstood.

Q Unless you want to take a break now.

A No, please continue.

MR. FORESTA: Michael Chang, if you could take the two-page document that has an Excel spreadsheet title on the bottom left-hand corner that says "Disclosed Spread Sheet."

(Deposition Exhibit 12 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q What exhibit is that?

A 12.

Q All right. You recognize this document --

A Yes.

Q -- Dr. Wecker?

A Yes, I do.

Q Can you tell us what it is, please.

A Okay, just a moment. The first two columns -- and when I say that, I mean from both pages, it's all one thing, the two columns from both page 1 and page 2 of Exhibit 12 -- constitute a replication of the results in Table 2 of Exhibit 3.

Q Exhibit 3 is the 1995 study?

A '97.

Q All right. So this is a replication of the results from Table 2 from the '97 study; correct?

A Yes.

Q That's just the first two columns. What's the third column of this Exhibit 12 represent?

A That's the same thing, but I've also added another variable, which is the occupation variable, blue collar, professional and so on. And you see that at the bottom of the second page.

Q All of the other data for the remaining categories is the same in columns 2 and 3; is that correct?

MR. MINTON: Object to the form.

MR. BURTON: Object to the form.

THE WITNESS: The input data is. This is a printout of output.

MR. FORESTA: All right. Michael Chang, let's take the next document. This is the 10- or 12-page document that has a title on the top "InterventionCity Crossed with Time Crossed with State."

(Deposition Exhibit 13 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q You have a copy of that, Dr. Wecker?

A Yes.

Q Can you identify it for the record, please.

A Well, it's one of my computer programs. Can you tell me what tab you got it out of?

Q I might be able to do that. 71.

A Okay, just a moment.

Q If you refer back to Exhibit 11, there's a printout, the directory for tab 71, that may help you identify this.

A Okay, just a moment. Okay. I've figured out what this one is.

Q Can you identify it, please.

A Okay. It's a printout of a computer program -- well, it's the executed result of the computer program that has the long name "logisticRegression," all one word. It's a SAS program. This is the output file.

Q And what was your purpose in running this calculation?

A Here I was looking at the issue of the statistical significance of the intervention effect in the COMMIT study, taking into account some additional information that is not taken into account in the 1995 article, which is Exhibit 2.

Q What additional information is that?

A The additional information is the quit rate of the different-studied cities prior to the intervention. Prior to the intervention program.

Q Okay.

Michael Chang, can you take the next document, should be a two-page document, have that marked Exhibit 14, please.

(Deposition Exhibit 14 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q Dr. Wecker, I will represent to you that this is another file that we printed out from a folder entitled "tab71."

A Okay, let me look for it. Just a moment.

Okay. I have got this one figured out.

Q Can you identify it for the record, please.

A Okay. This is just a fragment here, but it's producing quit rates, at the bottom portion of the first page and continuing on to the second page, that are the -- part of the input that goes into Exhibit 13, to the program that creates Exhibit 13.

Q All right.

A It's the quit rates.

Q This document precedes Exhibit 13 in its creation, correct?

A Right. You need -- Exhibit 13 needs this as part of its input.

Q And what's the source of the information contained in Exhibit 14?

A The COMMIT CDs.

MR. FORESTA: All right. Michael, can you take the document that has the title on the top "Harris Report 7 Replication," have the court reporter mark that as Exhibit 15, please.

(Deposition Exhibit 15 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q Dr. Wecker, I apologize for skipping around, but before we get to Exhibit 15, if you could go back to Exhibit 11, which is the graphical display of the file

directory, and turn to the page with the title "tab72."

A Okay.

Q Can you identify what the files are that are contained in the folder entitled "tab72"?

A Okay. Just a minute.

Q What I'd like you to do is explain what those files represent rather than whisper us what each of them is.

A Okay. The -- let me go after the easy ones first here. The second one, diff18.lst, that is an output from the next file, dot SAS, so we've got two of them, and the gist of this one is that it's replicating the result of the 1995 article where that article -- I think it's Exhibit 2, gets 1.8 percent difference.

Q Okay. That's with no new information, no new data, Dr. Wecker?

A Right, it's just a replication.

Q Okay. What about the next two files, what do they relate to?

A Okay, it will just take me a second. Okay, this is a calculation that is almost identical to the replication but it has one difference, and that is, I -- when it comes to the quit rates for each of these city pairs, I'm subtracting the quit rates -- that

differential that existed prior to the intervention, and then the rest is the same calculation.

Q I'm sorry, when you say the same as the -- "the rest is the same calculation," what are you talking about?

A We just talked about the diff18 calculation, which is a replication. Think of it as the calculation that gets 1.8 percent --

Q All right.

A -- the number that figures prominently in the '95 article. And first I simply replicated it to make sure I understood it and knew how it was calculated. And then with this program I'm telling you about now, I make a slight change. The slight change is to incorporate the prior quit rates, quit rates prior to the beginning of the intervention.

Q Okay. And that new calculation is reflected in the files diff18_88?

A Yes.

Q Okay. What about the paired files with the title "diff18_maBC"? Capital B, capital C.

A Okay, just a second. Okay, that is a calculation that's like the first one we discussed, the replication, but with one change. And that is, it's

restricted to blue-collar male people only.

Q Okay.

A Should I do -- should I do the last one?

Q Yes, please. I could guess.

A Yeah, that's -- okay, next question. That's an easy one.

Q Right. Let's move on to Exhibit 15, which we've already marked.

A Okay. All right.

Q Can you identify that for the record, please.

A Yes, I recognize it as a format from a Dr. Harris program, and if you were to look at -- I'm doing this from memory, so maybe I'll get a page wrong, but I think his, what I call report 7, it's the letter that comes after report 6 --

Q Okay.

A -- on the second page, you'd see a correspondence in the top portion of that page, if I'm remembering correctly, but if you give me a minute, I'll try to find it in my materials here. I think it's in tab 73.

Okay. It's -- so it's just running Harris's programs and replicating, without changing anything, his programs that get this item, and if I had his report 7

here, I'd double-check, but I believe if I pick it up, you'd find the same numbers in both places. I'm doing this because I'm about to make changes to this. It's a starting point.

Q You're about to make changes to what?

A Well, in the flow of the documents here that I'm -- that you're asking about, and I'm trying to explain, this is a starting point for some variations on this initial calculation, and --

Q I see.

A -- the whole point of it is, I didn't want you to search for a deep point here, it's just a starting point, and the deeper point is the variations that follow.

Q I thought you were about to change your opinions, Dr. Wecker.

A No, no chance.

MR. FORESTA: Michael Chang, I think the last document in the pile that you have may be a copy of a letter from Dr. Harris to Laurie Dix, dated September 27, 2000. You see that somewhere?

MR. CHANG: Yeah. You're talking about to Laurie Dix?

MR. FORESTA: Yes. Can you hand that to the

court reporter and have her mark that as the next exhibit, please.

MR. CHANG: Sure.

(Deposition Exhibit 16 was marked for identification by the court reporter.)

THE VIDEOGRAPHER: Excuse me, this is the videographer. In about five minutes, we'll have to break to change the tapes.

MR. FORESTA: All right, I only have five minutes of questioning left on this topic, and then we'll take a break.

Q We're going to put this aside for a second, Dr. Wecker, just because at the break I need to check something out about the document, so if you wouldn't mind just handing that back to Michael, we'll pick this up again, but I only wanted to mark it so that you would be able to say this is what I referred to as Harris report 7. But putting it aside for the time being, the handwriting that appears on page 2 of the letter, is this what you are referring to as Harris 7?

A Well, I think it is, but I don't have my materials from earlier deposition here. It certainly has the right appearance.

Q Okay. Why don't you give that back to Michael,

and we'll pick up with this document again, if we need to, later on this evening.

A Well, I'll give it to the court reporter, because now that it's marked, it seems like the right thing to do.

Q Thank you, sir.

All right, getting back to Exhibit 15, am I correct, sir, that the first two pages are -- well, why don't I ask you: What do the first two pages represent?

A The first page was the replication. It says "Replication" at the top of -- now maybe I can check the numbers. Just a moment. Right, these numbers on the first page of Exhibit 15 are the same as the top two panels from the second page of Exhibit 16.

Q Okay.

A And then you asked what's the next page?

Q Yes.

A That's a continued replication of the remainder of the tables in Exhibit 16.

MR. FORESTA: All right. Why don't we take a break at this point. We'll pick up in ten minutes.

THE WITNESS: Okay.

MR. MINTON: All right.

THE VIDEOGRAPHER: Thank you. The time is

4:08. We're going off the videotaped record.

(Recess.)

THE VIDEOGRAPHER: This marks the beginning of Videotape No. 2 in the deposition of William Wecker. The time is 4:34. We are back on the videotaped record.

BY MR. FORESTA:

Q All right, Dr. Wecker, we're back on. When we took our break, we were discussing Exhibit 15. And I believe you had described for the record, or identified for the record what the first two pages consist of; is that correct?

A Yes.

Q Would you turn to the third page, please, and explain for the record what that Excel chart represents.

MR. MINTON: Can you still hear us, Mike? Hello.

MR. FORESTA: Yeah, it's Steve, and we can hear you. Can you hear us?

MR. MINTON: Yeah, the picture's just changed weirdly here.

THE WITNESS: I'm pausing here to figure this one out. Just a moment. It looks to me like you've just printed page 1 over again.

BY MR. FORESTA:

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Q On page 1 of Exhibit 15, the heading says "Harris Report 7 Replication"; correct?

A Yes.

Q And on page 3 of my version of Exhibit 15, the heading says "Harris Report 7 Replication with R2 changed 3.0 to 1.0."

A Well, but not on my version.

Q Okay. Do you have a page following that that says "Harris Report 7 Replication with R2 changed 3.0 to 1.0"?

A Yes, I do, a couple of pages later.

Q Okay. Can you tell me what that page is?

A Okay.

Q Or what that chart represents, rather. I'm sorry.

A Just a moment. That's the same computation that is shown on page 1, and in this exhibit, again on page 3, except there's -- one of the parameters of the calculation that goes by the name of R2, in the page 1 calculation it has a value of 3 and in the page -- this is the page -- the fifth page here, it has been changed by me to 1.

Q And what is the R2 parameter?

A You mean what does it mean or what does --

Q Yes. What does it mean?

A It refers to a quit rate multiplier in the context of a Harris calculation for the 1963 to 2000 period.

Q So what you've done on this chart is you've changed the quit rate multiplier from 3 to 1 and you calculated the results and depicted them here on this chart?

A That's right.

Q Hopefully, the next page will have the heading "Harris Report 7 Replication with R2 changed 3 to 1.0 and r2 changed 0.7 to 1.0."

A Yes.

Q Is that what you see?

A That's what I see.

Q All right. Can you please explain for the record what this Excel spreadsheet chart represents?

A This makes the one additional change, as indicated in the title, that the Harris initiation rate multiplier, which he has set in the '63 to 2000 period equal to .7, I'm setting it equal to 1.

Q These are not calculations that you ran for the first time in the preparation of this report, are they?

MR. UGARTE: Objection.

THE WITNESS: Well, I've run calculations that are similar to this, but I believe these -- this may be the only -- I'd have to go look at my earlier deposition. Whatever I ran before is in my work papers from my other depositions, and I've done something similar to this, but I don't believe quite exactly the same thing.

BY MR. FORESTA:

Q Okay. So is it true, Dr. Wecker, that prior to your preparation of this supplemental report, you had not run a calculation of the Harris model with the quit rate multiplier set at 1?

MR. UGARTE: Objection.

THE WITNESS: Well, there's two quit rate multipliers, and so I'll start with that. Second, I would just have to get the materials I do not have with me, but you have them, and I have them back at my office, to look through the several volumes of computer work that I've done previously, and given to you, to see exactly what runs I had done previously. I just don't remember that well enough to tell you.

BY MR. FORESTA:

Q What is the basis for running the Harris model as it's depicted in the third page -- the fifth page of

this Exhibit 15 with a multiplier of 1 as opposed to 3?

A Well, that idea is the one we were discussing before the break, where I have taken the COMMIT data, and using that data, and a Harris program, I have found quit rates -- quit rate multipliers of essentially 1. So now I'm going to the next obvious step which is following the Harris calculation method and using that as input to his successor program.

Q So you -- so I understand it, you took the COMMIT data and you calculated a quit rate multiplier of 1; is that correct?

A Essentially 1. It's 1 with some decimal points and it's not significant, so essentially 1.

Q And the calculations that led to your arriving at "this is the quit rate" are set forth in the materials in your binder, Exhibit No. 5; is that correct?

A Yes, there, and it's also described in my report in the place that I directed to you -- directed you to on page 4.

Q Well, the only number that I saw on page 4 of your report is a multiplier of 1.04. That's different than 1.0; correct?

MR. MINTON: Objection. Object to the form.

THE WITNESS: It's different, but I'm describing it as essentially 1. It's not statistically different from 1, and it is the starting point that motivates the calculation where I'm using a value of 1 in the Exhibit 15 materials that we were just discussing.

BY MR. FORESTA:

Q All right. I just want to make sure that when you make a reference to a number in your expert report, the only number that I see is 1.04, and what you're saying now in the model that you ran as depicted in Exhibit 15, that is represented as 1.0?

MR. UGARTE: Objection. Mischaracterizes the expert report.

MR. MINTON: Also asked and answered.

BY MR. FORESTA:

Q Just trying to clarify the record, make sure I understand.

A The motivation for the Exhibit 15 materials in part, since the opinion that I arrive at of not finding any noticeable effect from information I had before I started the COMMIT data. But the new thing here in this new report is that I studied the COMMIT data, and the COMMIT data leads me to a number that is essentially a

quit rate multiplier of 1. I print it here as 1.04, and I describe it as a statistically insignificant quit rate, meaning not differing statistically from a value of 1. Bearing that in mind, I said, "Well, now let's see what the rest of the Harris programs do when you use a value of 1 instead of a value of 3," as he has used.

Q All right. And that's depicted in the fifth page of your Exhibit 15 as you've already testified. And the next page again uses the 1.0 quit rate multiplier and then changes the initiation rate; is that correct, from .7 to 1?

A Right.

Q What is the basis for making that change, Dr. Wecker?

A Well, you can -- I could refer to the COMMIT study where they find no noticeable effect on prevalence, but I think more fairly, it's that plus the cumulative understanding that I've arrived at from all of the study I've done in this case, and which has been the subject of your questions in at least two other depositions.

Q The COMMIT study did not analyze initiation rates, did it?

A It does mention prevalence. I'd have to study

for a bit to find the spot. So if it finds no effect on quitting and no effect on prevalence, that's -- suggests to me that there's no effect of any kind.

Q My question is: Did the COMMIT study analyze initiation rates?

A Well, I gave you a good answer to that.

MR. MINTON: Object to the form.

BY MR. FORESTA:

Q And I'll ask the question again, because you said it mentions prevalence rates. And I just want a yes-or-no answer.

Does the COMMIT study analyze initiation rates?

MR. MINTON: Object to the form. He doesn't have to answer yes or no.

THE WITNESS: I --

BY MR. FORESTA:

Q Can you answer yes or no?

A I don't think a meaningful answer could be a one-word answer here. I would have to review the voluminous materials to see if they ever get around to mentioning initiation rates, at least I don't recall it right now, but they may well have. I do recall that they mentioned that they saw no effect on either prevalence or quitting, at least no large effect.

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And --

Q How many people were included in the COMMIT study at its outset?

A Oh, well, it depends on what you mean by the "outset." The rostering phase or the -- the beginning had a fairly complicated start. There were long lists of houses -- or households, and then a smaller list of some 35,000 folks, and it kept whittling down from there depending on what they were doing.

Q Have you ever seen the figure 20,347 people as a number of people included in the COMMIT survey?

MR. MINTON: Object to the form.

THE WITNESS: 20,347? Just a moment.

MR. MINTON: Do you want to say whether or not you're talking about baseline, evaluation, endpoint, what you mean by the term "survey"?

MR. FORESTA: I think I said in the COMMIT study.

MR. MINTON: Well --

THE WITNESS: I know where that number comes from, yes. I've just added two numbers. That's the number that they intended to follow up. It's the number that if you had had all responding people in 1993, you would see 20,347 males and females.

BY MR. FORESTA:

Q And that's the number of people that the investigators of the COMMIT study intended to follow; correct?

MR. BURTON: Object to the form.

THE WITNESS: That's my understanding of what they were doing, yes.

BY MR. FORESTA:

Q How many of those people were smokers?

A All of them.

Q None of those people would have started smoking during the onset of the -- or during the time period of the COMMIT study; correct?

MR. MINTON: Object to the form --

MR. UGARTE: Objection.

MR. MINTON: -- of the question.

THE WITNESS: That depends on where you start the time period. But I take it that by the time they get to this four-year follow-up phase, they were current smokers as of that time.

BY MR. FORESTA:

Q Do you think that some of the 20,347 that the investigators intended to follow were not smoking at the outset of the COMMIT study?

MR. UGARTE: Objection. Calls for speculation.

THE WITNESS: I didn't think so.

BY MR. FORESTA:

Q Can you turn to the next page of Exhibit 15, please.

A Just a moment. Okay.

Q Does your version have at the top of the page "Harris Report 7 Replication with R2 changed to" -- "changed 3 to 1.0 and r2 changed 0.7 to 1.0 and R1 changed 1.5 to 1.0"?

A Yes, it does.

Q Can you tell us what the -- what this page represents?

A Yes, it's the same as the previous page with the one additional change, that the quit rate in the earlier period, 1954 to '62, I think, has been changed from the Harris multiplier of 1.5 to a value of 1.

Q And what was your basis for changing the earlier quit rate from 1.5 to 1?

A Importantly, and in part, the finding from the -- my study of the COMMIT data that there was no effect of the intervention, and, additionally and cumulatively, my findings of -- that have been the subject of your two other depositions where we've talked

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about the lack of effect of information such as Sellikoff (phonetic) messages.

Q The next page on Exhibit 15 appears to be the same -- to have the same title as the previous page except the last line now says "and r1 changed 0.9 to 1.0." Do you see that page, Dr. Wecker?

A Yes, I do.

Q Can you tell us what this chart represents?

A It's the same as the previous page except for the one change where the '54 to 1962 time period initiation rate multiplier has been set to 1.

Q What was your basis for changing the initiation rate from .9 to 1?

A Importantly, the COMMIT study results, but cumulatively and also all the indications that I've gotten of the lack of effect of these kinds of informational programs that we've discussed. I guess you weren't there, but in other depositions in this case that were taken by some of your colleagues.

Q And tell me how the COMMIT data influenced or affected your opinion that led you to change the initiation rate for the earlier period of time from .9 to 1.0.

A That would be the same answer I gave before.

The indication is of no -- no effect from these programs either in terms of quitting or prevalence which implies initiation.

Q How many nonsmokers were the subject of a COMMIT intervention?

A Well, there were --

MR. MINTON: Object to the form.

THE WITNESS: I don't have a number, but there would be a lot of residents in the intervention cities who were nonsmokers.

BY MR. FORESTA:

Q And it's your testimony that they were targets of the COMMIT intervention?

A They were -- they would be recipients of that information.

Q And how many of those people were studied by the investigators of the COMMIT study?

MR. UGARTE: Objection. Vague and ambiguous.

THE WITNESS: Well, I don't have a ready answer for that. I'd have to find, and I don't believe I have here, more voluminous materials. If maybe -- you want me to take the time, I can look through what little I have here, which is Exhibit 2 and 3, and look for references to -- for example, prevalence.

BY MR. FORESTA:

Q Well, we're going to turn to Exhibit 2 and 3 in a few minutes anyway, so --

A Okay.

Q -- we'll deal with that topic, then.

A Great.

Q I just want to get one more computer printout out of the way so we can move on to another topic.

Michael, can you take the one-page document out there that has a series of boxes, have that marked as Exhibit 16, please.

THE REPORTER: I think we should be at 17.

MR. FORESTA: I'm sorry, 17.

(Deposition Exhibit 17 was marked for identification by the court reporter.)

BY MR. FORESTA:

Q Do you have that, Dr. Wecker?

A Yes, I do.

Q And do you recognize it?

A I do, yes.

Q Can you just state for the record what this one page reflects?

A This is all related to the materials we've been looking at with the various changes setting certain

Harris inputs equal to 1. The first thing I notice here, if you permit, is that I inadvertently left off the fourth row of the first table. And if it's okay with you, I could just write those numbers in on the exhibit. If you don't want me to do that, that's fine.

Q I don't have a problem.

A Okay.

Q You can write it down.

A I'll just write them out.

Q Can you just state for the record what the numbers are so I can mark it on my version.

A Okay. 0.1046; 0.0990; 0.0904; 1.000.

Q Can you tell me what the first series of four boxes represents?

A The first panel is, as it says, just a replication on -- of the second and third page of the Harris report 7. This is an intermediate calculation in that chain of arithmetic. I think there is a spot where you can see a display something like this in Harris report 6, but I don't have that with me. But anyway, when you do the calculation in report 7, you have to do this step in order to get to the answers in Exhibit 15.

Then, if I can just continue, the other ones are easy, because we've been through this.

Q Right.
A R2 set equal to 1 and so on. It's cryptic, but you should have the idea by now.
Q Again, this is a situation where Exhibit 17 is generating intermediate information that is then plugged into the charts of Exhibit 15?
A Right. It's really one -- you're exactly correct. You do the -- you do 17 as part of coming up with 15, but it's really 15 that is, you might say, the bottom line of the calculation or the more-easy-to-interpret part of the calculation.
Q All right. Let's go to Exhibit 2, which is the 1995 study.
A Okay, I got it.
Q And if you could look through that now and show me where there is evidence or where there is any mention here on the effect of a COMMIT intervention on smoking initiation rates.
A Okay. This is -- this will take a few minutes. I'm going to read it. It's a ten-page document. I'll get started.
Q Thank you.
A Just to give you a chance to stop this process, I'm partway through the second page, but I've already

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found two places that I could call your attention to.

Q Okay.

A And I'd be glad to continue this, but I want to give you a chance to tell me to stop, if you don't think I'm going fast enough. What's your pleasure?

Q Can you tell me the first two that you've found?

A Okay. On the first page, in the middle, I read the section that says that a "communitywide strategy would make it difficult for residents to avoid exposures to the messages about the importance of nonsmoking," and then it continues, "and would alert smokers to . . . opportunities for cessation." I take that as -- consistent with the point that I made earlier. Would you like the second one?

Q No. I'd like you to answer this question first. Does that passage that you just read show that the COMMIT study investigators were investigating the effect of a COMMIT intervention on initiation rates?

A Not by itself. It shows that they were -- they were recognizing that the interventions would be interventions for the entire population of residents including the smokers and nonsmokers. I think that -- it doesn't seem like much of a stretch to see how that

would affect initiation as well as quitting.

Q Okay. Let me ask a different question, then, to try and narrow your review of the document. Can you point to me, somewhere in this 1995 report, the results that show what effect the COMMIT intervention had on initiation rates?

A I haven't gotten that far. I've gotten partway through the second page, and I might helpfully tell you what I find there because it seems to point to a document of the kind you're inquiring about.

Q Okay.

A In the first column on the second page, which is page number 184 --

Q Yes.

A -- about the middle there, it says "Cross-sectional changes in prevalence were measured as another test of the intervention and are reported separately," and it gives a footnote 11 to study in which they talk about changes in prevalence.

Q Okay. Footnote 11 makes reference to an article entitled "COMMIT Research Group Community Intervention Trial for Smoking Cessation," in parentheses "(COMMIT): Roman II. Changes in Adult Cigarette Smoking Prevalence." Do you see that?

A I do.

Q Did I read that correct?

A I wasn't following you. Sorry. I didn't proofread it for you, but --

Q That's all right. If you just take a look, though, at footnote 11 and the article that's referenced there, I want to ask you: Is that an article that you have referenced as material that you considered in formulating the opinions that are set forth in your Exhibit 1?

A No, it's an article that's included and mentioned in an article that I cited.

Q Did you consider the article in formulating the opinions set forth in Exhibit 1?

A I did not specifically consider that article, but I did consider the point that is --

Q So when you -- I'm sorry.

A Go ahead.

Q Can you finish your answer. I didn't mean to cut you off.

A That's okay, go ahead. Go ahead.

MR. FORESTA: Can you -- Court Reporter, can you please read back the last response. I lost it on this end.

(Record read.)

BY MR. FORESTA:

Q The point is what, Dr. Wecker?

A The point is that the COMMIT intervention was an intervention that would have exposed residents, whether they are smokers or not, to messages about the importance of nonsmoking. And I'm quoting from the Exhibit 2 article. That's not --

Q And you --

A Let me just finish. That's not a quitting story, that's an all residents, importance of nonsmoking statement. Go ahead.

Q You came up with a specific number in your calculations for a change in smoking initiation rates; isn't that correct?

A In the calculation that is in Exhibit 15, if that's what you mean, yes.

Q That's what I mean, yes. And in arriving at that number, you said you relied upon the COMMIT study --

A In part, yes.

Q -- correct?

A In part.

Q In part. In part. And I want to know what

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part of the 1995 study, besides this reference to another article, supports the change that you made in the initiation rates for smoking --

MR. MINTON: Object to the --

BY MR. FORESTA:

Q -- as part of the calculations set forth in Exhibit 15.

MR. MINTON: Object to the form of the question. It assumes that "the COMMIT study" is entirely embraced in the 1995 article.

MR. FORESTA: I'm limiting right now to Exhibit No. 3, which is the 1995 study. I just want any reference in there that show quantitatively what the change in smoking initiation rates were as a result of COMMIT interventions.

MR. MINTON: That's a different question.

BY MR. FORESTA:

Q Can you answer that question, Dr. Wecker?

A Well, I've -- I went forward trying to answer your question that was like that, and I got these two points to tell you about as I made it onto the beginning of page 2. And if you want me to, I'll continue from there and see what other points I might find. But I just don't have a photographic recall of these things,

and your question really requires me to go through the document to find them.

Q What I would like you to do, Dr. Wecker, is go through the report, and point out to me any section of this 1995 study that quantifies the effect of a COMMIT intervention on smoking initiation.

A Okay. You've got one -- you've got one point -- the two points I've made are certainly relevant to that, and I would take -- and I will continue from there and see what else I can find.

Q Is it your testimony that those first two points represent a quantification of the effect of COMMIT interventions on smoking initiation?

A No, I don't think they quantify, but I mentioned those points in answer to your question that was earlier. And your earlier question didn't say quantify, so --

Q Now I'm asking a different question.

A So I'm going to proceed, if you want me to, and I'll pick up on page 184, and I'll see what else I can find.

MR. MINTON: And again, I object to the characterization of that being "the" COMMIT study, because he's referenced at least two other COMMIT

studies or write-ups of COMMIT data that he has discussed.

BY MR. FORESTA:

Q You would agree with me, Dr. Wecker, that the first two references in the 1995 study that you pointed out do not quantify the effect of COMMIT interventions on smoking initiation; correct?

A I think that's correct, although the second reference is of a special kind in that it's pointing to an entire report.

Q A report that you did not consider in preparing this -- your supplemental report; correct?

MR. UGARTE: Objection.

THE WITNESS: That's correct, I did not. I'm waiting for your question.

BY MR. FORESTA:

Q Oh, I'm sorry. My question is: Can you point out to me anything in the 1995 study which has been marked as Exhibit 2 that quantifies the effect of COMMIT interventions on smoking initiation rates?

MR. UGARTE: For the record, you're referring to the text of the study as opposed to the underlying data that consists of COMMIT data that supported the study?

MR. FORESTA: Show me anything here.

MR. UGARTE: Again, you're talking about the text of the article; correct?

MR. FORESTA: If he knows that there --

Q Dr. Wecker, I'll address this to you rather than Mr. Ugarte. If you know of any reference in a footnote that quantifies the effect of a COMMIT intervention on smoking initiation, please let me know that.

A Okay, I'm going to take some time here, because quite a few pages, and when you don't hear me talking, it's because I'm reading.

Okay. I'm finished.

Q All right, did you find anything?

A No, I don't find anything further in this particular article that would be responsive to that -- to your question.

Q Dr. Wecker, is prevalence the same thing as initiation?

A No.

Q What is prevalence?

A It's a proportion of -- in this context, it's the proportion of a population who are smokers.

Q And what is initiation?

A It's an event of changing from status of nonsmoker to smoker.

Q Can you take a look at Exhibit 3, which is the 1997 article entitled "Predictors of Smoking Cessation in a Cohort of Adult Smokers Followed for Five Years."

A I have it.

Q Okay. Is it your opinion, Dr. Wecker, that there is information or data contained in this report that supports your belief that the COMMIT interventions influenced or affected initiation rates?

A Okay, I'll have to review this one too, because I don't have that detail to recall. I'll get started.

Q Okay. But just before you do that, you don't have a recollection one way or the other as to whether or not this report has information relating to the effect of COMMIT interventions on initiation rates?

A I can't tell you where I have read what I recalled earlier about the lack of effect on prevalence. And so it might be in here, it might be in some other reference, so I'll -- to answer your question, I'll just have to take the time to look through it.

Q But just before you do that, information on the lack of an effect on prevalence is different than an effect on initiation rates, isn't it?

A It's not different, if you also understand a lack of effect on quitting.

Q Okay.

A Shall I begin?

Q So your -- I'm sorry, you finished the answer?

A I finished the answer.

Q Okay. So your opinion that there is an effect on initiation rates is a combination of your belief on the effect of the COMMIT interventions on quitting, plus information relating to the prevalence of smoking amongst the COMMIT communities --

MR. MINTON: Object --

BY MR. FORESTA:

Q -- is that a fair characterization?

MR. MINTON: Object to the form.

THE WITNESS: As far as COMMIT goes, I believe that's the impression that I took away, but my recollection is imperfect on exactly what might be printed here, and so if I -- if you want me to review it to look for other sentences that might be more on target, I'd be glad to do it.

BY MR. FORESTA:

Q Well, I will once again, then, now that I understand better your approach to this, what I would

like to do is ask you more specifically, if you could review the 1997 study and see if there is anything in here that quantifies the effect of COMMIT interventions on initiation rates.

A Okay, I'll get started.

Q Thank you.

A I don't see any quantitative assessment of initiation in the '97 article.

Q Doctor, do you believe that education about smoking can have an effect on smoking quit rates?

A From the evidence that I've seen, it appears that it does not.

Q Under no circumstances, in your opinion, could a campaign of education on smoking have an impact on quit rates --

MR. MINTON: Object --

BY MR. FORESTA:

Q -- is that your testimony?

MR. MINTON: Object to the form of the question.

THE WITNESS: That's not what I said.

BY MR. FORESTA:

Q Okay, then I misunderstood your response.

In general, do you believe that a campaign of

information on smoking can have an effect on smoking quit rates?

A From the evidence that I've seen, it appears that it does not.

Q And what's the evidence that you've seen on this subject?

A Well, as far as the subject of this deposition, it's just the COMMIT data. Of course, in my other depositions, there have been questions on these issues there as well. But limiting myself to this deposition issue, it would have to just be the COMMIT data.

Q Based on your knowledge of other information, outside of COMMIT data --

MR. UGARTE: Objection. Doctor, I'll instruct you not to answer. We are here about the COMMIT data.

MR. FORESTA: I'm asking his opinions on quit rates. This is the very subject of his testimony, and you can't direct him not to answer a question because he's not your witness.

MR. UGARTE: It's outside of the scope.

MR. FORESTA: It's not outside of the scope.

MR. UGARTE: It's outside of the scope.

MR. FORESTA: It's a fundamental aspect -- Rich, it's a fundamental aspect of his testimony here.

MR. UGARTE: I understand that.

MR. FORESTA: If he tells me that under no circumstances at all could a campaign of information on smoking ever change quit rates, I'm entitled to know that, if that's his opinion.

MR. UGARTE: He is asked -- you've asked the question, and he has told you that based on the COMMIT data that is at issue in this deposition; that's how he answered the question.

BY MR. FORESTA:

Q And I'm asking you, Dr. Wecker, outside of the COMMIT data, are you aware of any studies published in the medical or scientific literature that show that a campaign of smoking information or smoking education can have an effect on quit rates?

MR. BURTON: Let's stop here for a minute. Steve, you've had this man, or someone from the plaintiffs had this man on examination on this issue for 16 hours in connection with his original report. He was deposed for 16 hours. We are here in connection with this report. What I don't want to have happen is transform this deposition, which is a supplemental report based on the COMMIT data, into a deposition or a redeposition about his original report. We're not going

to do that.

MR. FORESTA: Okay, that's fine. And that's not my intention. What I want to find --

MR. BURTON: That's what you're asking.

MR. FORESTA: No, that's not what I'm asking. What I want to find out now is whether Dr. Wecker has put blinders on for purposes of this supplemental report.

MR. BURTON: He already told you he didn't.

MR. UGARTE: And you have asked and answered that question in prior testimony. It's on the record.

BY MR. FORESTA:

Q No, I'm asking you, Dr. Wecker, right now, are you aware of any literature, any articles in the scientific or medical literature, that show that education on smoking has an effect on quit rates; are you aware of that?

MR. UGARTE: Objection. Dr. Wecker, I'll instruct you not to answer that question. We are here to talk about the COMMIT data as referenced in this report.

MR. FORESTA: And you cannot instruct this nonparty witness not to answer a question.

Dr. Wecker, if you adhere to the instruction of

counsel and don't answer this, I will move to have this deposition reopened, and we will have you come back again. I'm entitled to an answer to that question.

MR. BURTON: We're not going to have threats to the witness, Steve. If you're going to do that, I'm going to shut it down right now.

MR. FORESTA: It's not a threat to the witness. He is not your client; you cannot instruct him to do that.

MR. UGARTE: I'm going to note for the record that in past depositions your firm has shut down depositions on the grounds of being outside of the scope, for the record. If you want to pursue that, you're entitled to it. But you're not going outside of the scope of this deposition here.

MR. FORESTA: It's not outside the scope of the deposition. I'm entitled to know whether in formulating his opinions, as set forth in the supplemental exhibit, he considered anything other than the COMMIT study.

MR. BURTON: You've asked him that question --

MR. MINTON: It's a different question. He can answer that.

MR. BURTON: -- and he said that he limited this report to the COMMIT data, but that he was

questioned about it in connection with his original report and there was data there.

MR. FORESTA: That's a different issue. That's a different issue. What I want to know now is whether he is aware of any studies in the medical literature that show that a campaign of smoking education can have an impact on quit rates.

MR. UGARTE: I'd like to go off the record for five minutes, if possible.

MR. FORESTA: You want Dr. Wecker here for this?

MR. UGARTE: No. Dr. Wecker, you can stay here. I think we should leave to make it easier. Off the record.

THE VIDEOGRAPHER: The time is 5:36. We're going off the videotaped record.

(Recess.)

THE VIDEOGRAPHER: The time is 5:58, and we're back on the videotaped record.

BY MR. FORESTA:

Q All right, Dr. Wecker, we're back on the record. And before the lawyers started doing what lawyers do best, I asked you whether you believe that education about smoking can have an effect on smoking

quit rates, and your answer was that, from the evidence that you've seen, it appears that that -- it does not. Is that a fair characterization of your testimony or your response to my question?

A I thought I mentioned the evidence that I was talking about in this deposition from the COMMIT study. But with that inclusion, I believe that's what I told you.

Q And that's what I want to find out. When you use the word "evidence," "from the evidence" in that response, are you talking about evidence relating to the COMMIT study?

MR. BURTON: I'm going to object to the form. Are you talking about his opinion, Steve, as reflected in the supplemental report exclusively, or are you asking a broader question?

MR. FORESTA: What I really want to find out, Dal, is whether, in response to my question, he was limiting it to, for all intents and purposes, the opinions in this supplemental report which has to do with the COMMIT study.

MR. BURTON: Why don't we have the question again so Dr. Wecker can focus on it.

(Record read.)

THE WITNESS: Well, that seems like an elaboration of a larger question, so without specific reference to the earlier question, I'll see if I can be helpful here, if that's all right.

BY MR. FORESTA:

Q Please.

A Certainly at one point in your questioning a few minutes ago, when I referred to evidence about quit rates, I was talking about the subject of this deposition which is my study of the COMMIT data, and what it has to say about quit rates, and how they respond, or not, to interventions. We're all aware that I've been through -- I'm not sure I can count them, but two or three other depositions here, and much of those matters that were discussed there had to do with quit rates. But what they didn't have to do with was the new material here on the -- with the COMMIT data, because that's data that I didn't have then and do have now.

So without going back and reviewing the material from other depositions but limiting myself to the material that I've prepared to discuss with you today, then I would, with that limitation, be talking about the COMMIT data.

Q Dr. Wecker, to what extent, if any, are you

relying on studies other than published studies relating to COMMIT in formulating the opinions that are set forth in Exhibit 1?

A What's Exhibit 1?

Q Your supplemental expert report.

A Okay. Just a minute.

The only database responsive to your question here pertaining to Exhibit 1 is the COMMIT database.

Q Okay. And my question was a little bit different than that. It asked whether there were any published studies relating to -- or other than those relating to the COMMIT study that you relied upon in formulating the opinions set forth in your supplemental expert report.

A Well, I mentioned some other materials that I had reviewed, such as the CDC article that summarizes COMMIT and a number of other studies, but I think I would take that as just part of my general background that I incorporated into my understanding in doing this work. And I mentioned the surgeon general 2000 report, so those -- just to take that example, the surgeon general 2000 report is not just a COMMIT study report, it's a bit broader than that. But again, I think those were broadening researches by me in background. When it

comes down to the actual calculations, I'm really only working with the COMMIT data, as far as Exhibit 1 is concerned.

Q But in terms of figuring out what calculations to do, you also rely on the CDC report that you discussed previously; isn't that correct?

A In one aspect. Generally not. But in that one calculation where I simply implemented the CDC-recommended method, that would be true. But that's the only place where that calculation shows up.

Q Is there a reason why you didn't implement the CDC-recommended calculations in any of the other calculations you ran?

A I hadn't read the CDC report when I did the others.

Q And is it your testimony that the first time you conducted the evaluation that was provided to us that -- excuse me, let's strike that.

Is it your testimony that the first time you ran the calculation that was provided to us yesterday was after the December 4th deadline --

A Yes.

Q -- for submitting your expert report?

A Actually, I think -- that's true, but I believe

I also said I think I might have run it yesterday or the day before but not earlier, just a couple days ago.

Q And that was the first time?

A Yes.

Q Can you turn to your supplemental report, please, Exhibit No. 1.

A Okay.

Q You state in this report, on the first page, that you have two principal conclusions drawn from your review of the materials, analysis and calculations referenced in Dr. Cummings' September 22, 2000 report?

A Just a moment, let me catch up here. Okay.

Q The first principal conclusion that you draw, Dr. Wecker, is that Dr. Cummings' estimate of the effect of education about smoking on the smoking quit rate based on his analysis of the COMMIT data is statistically flawed and overstated; correct?

A Yes.

Q And the second principal conclusion that you draw based on your review of the materials referenced in Dr. Cummings' report is that Dr. Cummings' estimate of the effect of education about smoking on smoking quit rates contradicts Dr. Harris's estimated effect of information about smoking on smoking quit rates and

shows that Dr. Harris's smoking "attributable," in quotes, claims estimate is overstated. Is that correct?

A Yes.

Q Are there any other conclusions that you've drawn based on your review of Dr. Cummings' September 22, 2000 report?

A No other principal conclusions. This is just an introductory paragraph. The report then continues with the details.

Q Okay. I just want to make sure there isn't anything that was left out of this report.

When was the last time that you reviewed this report, Dr. Wecker?

A I'm not sure if I looked at it today or not. It's getting a little late in the day here, but I may have looked at it today, and possibly I looked at it yesterday. I just don't recall.

Q Is there anything contained in this report, Dr. Wecker, that you know not to be correct?

A No. I don't know of anything that's incorrect in here.

Q All right. Your first principal conclusion, if I understand it correct -- there are two parts to it. First, that Dr. Cummings' estimate of the effect of

education about smoking on smoking quit rates, based on his analysis of the COMMIT data, is, quote unquote, statistically flawed; correct?

A Yes.

Q And the second part of that first principal opinion is that Dr. Cummings' estimate of the effect of education about smoking on the smoking quit rate, based on his analysis of the COMMIT data, is, quote, overstated, end quote; is that correct?

A Yes.

Q I want to start with the second component of that, your opinion that his estimate is overstated, and ask you: What is the basis for that opinion?

A Well, that's -- that whole section that, for the next couple of pages, let me -- do you want me to pull out the portions of this following pages that relate to that sentence fragment; is that what you want to do?

Q No, what I want to find out is whether there is any basis for that conclusion that is not set forth in your expert report. And if you tell me that the basis for that opinion is the material that follows on the succeeding pages, then I will accept that answer.

A Well, it is. Although you have to bear in mind

that that succeeding page is then -- point to footnotes in reference materials, but with all that well understood, my report is, I believe, complete.

Q What is your estimate of the effect of education about smoking on smoking quit rates based on the COMMIT data?

A I didn't understand what you meant.

Q Do you have an estimate of the effect of education about smoking on the quit rates based on the COMMIT data?

A Yes.

Q And what is your estimate?

A Well, I believe there was no significant effect of the intervention on quit rates.

MR. FORESTA: Michael Chang, are you there?

MR. CHANG: Yeah.

MR. FORESTA: Do you have a document entitled "Supplement to Expert Witness Report Prepared by: K. Michael Cummings," dated September 22, 2000?

MR. CHANG: Yes, I do.

MR. FORESTA: Can you hand that to the court reporter to be marked as the next exhibit, please.

MR. CHANG: Yeah, sure.

(Deposition Exhibit 18 was marked for

identification by the court reporter.)

BY MR. FORESTA:

Q Do you have that, Dr. Wecker?

A Yes.

Q And I believe you testified earlier that you have reviewed this document before?

A Yes.

Q And this was a document that was provided to you, I believe you testified, by Mr. Leibenstein?

A Well, I wasn't sure about that, but I think -- it certainly came from -- through counsel. I didn't open the package, so I wasn't sure exactly who mailed it.

Q I'd like you to turn to page 24 of the Cummings supplemental report, Exhibit 18.

A Okay.

Q Let me direct your attention to paragraph 10.3; do you see that?

A Yes.

Q Dr. Cummings writes in that paragraph, this is the second sentence, for your information, quote, "The COMMIT study demonstrated that education about smoking can increase quit rates in a population."

Do you agree with that statement, Dr. Wecker?

A I don't. I don't believe it did demonstrate that.

Q Dr. Cummings goes on to say, "The COMMIT education program was successful in significantly boosting quit rates by 1.8% overall."

Do you agree with that statement?

A I would disagree with that statement as well.

Q Dr. Cummings says, "The COMMIT education program was found to be most effective in increasing cessation rates in those with less years of formal education (i.e., non-college graduates)."

Do you agree with that statement?

A Well, I guess I get off the train here on the premise, since I don't agree that it had an effect, let alone more on one group and less on others. When I look at the data, I don't see any significant effect here.

Q On any group that was studied in the COMMIT study; is that correct?

A Well, I was -- I wasn't thinking that broadly. I was thinking in the context of this paragraph, where we just got done talking about the 1.8 percent, and I thought the next sentence was really continuing with that context. And since I got off the train on the previous sentence, I thought that elaborations of that

point would be affected by the fact that I don't agree with the main point.

Q You're familiar with the COMMIT data, are you not?

A Generally, yes, I've analyzed some of it, and -- what do you mean?

Q Well, as a general proposition, not focusing on Dr. Cummings' opinion that the education program significantly boosted quit rates by 1.8 percent, I want to ask you, do you agree that the COMMIT education program was found to be most effective in increasing cessation rates in those with less years of formal education, i.e., non-college graduates?

MR. BURTON: Steve, are you talking about regardless of gender or regardless of level of smoking, or were you being more precise?

MR. FORESTA: Talking about people with less years of formal education, i.e., non-college graduates, whether they're women, men, anything.

MR. BURTON: Regardless of how much they smoke?

MR. FORESTA: General proposition.

Q Was the COMMIT study more successful in increasing cessation rates in those with less years of formal education? You know what? I'm going to strike

that, because that's changing what it says here in the report.

Was the COMMIT education program found to be most effective in increasing cessation rates in those with less years of formal education, i.e., non-college graduates?

A Well, I'm trying to think of what an analysis I have here that might help with that, and perhaps the one that comes most to mind is the analysis I did restricting to blue-collar participants in the study.

Q Why is that?

A Because I'm going to suppose they tend to have less education than lawyers like yourself.

Q Did you do an analysis of participants in the COMMIT education program who did not have non-college graduate degrees?

MR. BURTON: Object to the form.

BY MR. FORESTA:

Q Who did not have college degrees.

A Well, I was -- certainly some of -- the way you pose the question, of course, because there's some of everything in that data set. But I think you meant non-college degrees and leave out the other folks, as opposed to just have them be a part of it. And the

closest thing that I can think of right now to that was the blue-collar analysis that I was mentioning.

Q That is a different analysis than doing an analysis of COMMIT study participants who are non-college graduates; would you agree with that?

A Yes, I agree, it's not the same thing, but I thought it was responsive because it seems to be essentially on that point.

Q All right. But you did not do a study limited solely to the sample with a population of COMMIT study participants who are non-college graduates; am I correct?

MR. UGARTE: Objection.

MR. MINTON: Yeah, I object to the form. What do you mean by "study"? You mean any logistic regression analysis? Any anything?

BY MR. FORESTA:

Q Any analysis that you did, Dr. Wecker, focusing on the quit rates for COMMIT-studied participants with less years of formal education, i.e., non-college graduates; did you study that subset?

A Well, let me see if there's something else in here other than the blue-collar analysis I mentioned that is not quite -- I acknowledge not quite the same

thing as you're saying, but I think in fairness it's similar. Let me just take a moment.

MR. UGARTE: I'm going to also object to the form of that question, particularly to the extent that there is -- any of the tabbed references that deal with that issue.

MR. FORESTA: Why did my question presume that he was not allowed to look at any of the tabbed information? He can look at whatever he wants. I'm asking him the question. You don't need to direct him where to look. He's prepared the documents, Rich. He knows where to look.

MR. UGARTE: That was not intended to prepare him where to look. What you're trying to do is describe the study that he conducted as not having to do with education, and I'm simply pointing out that his report is an analysis of that issue, as well as the blue-collar male issue.

BY MR. FORESTA:

Q Dr. Wecker, you did an analysis of the COMMIT --

MR. MINTON: Wait. Hold it. Wait. Stop. He's looking.

THE WITNESS: I was looking. I hadn't found

it. I can't help but perk up when I overhear the lawyer suggesting it's in here but I've missed it. It's getting late in the day, but I didn't notice it.

MR. UGARTE: Doctor, I am not suggesting it's in it. I just think that the question is unfair in that there is a binder of information there that no one in this room has, and I feel that I just want to make it clear for the record that plaintiffs' counsel will be provided with that data; in fact, has that data in front of him. And so I don't want them to misrepresent the record here.

MR. FORESTA: I don't have the data in front of me.

Q And the reason why I'm asking you, Dr. Wecker, is because we don't have a full set of the information. I wish that we did. What I just want to know from you is whether you ran any analysis or any calculations on quit rates as they applied to what is referred to in this report as "COMMIT education program participants with less years of formal education, i.e., non-college graduates."

A Okay, let me make a short comment and then answer that. As to whether you have what I have, you really do. That -- all I have here that I was looking

through is -- this binder is a printout of materials that you've already been provided on -- in computer form. So you really do have what I have.

But as to the question, I don't see -- I was looking, just in case I had it. I didn't see, and I don't believe I overlooked it, a study that was limited to individuals with -- I think you said no college education or something like that. I remember looking at that, and so I thought I might find something on that, but I didn't find it in flipping through.

Q So the only basis that you have for disagreeing with the statement that the COMMIT education program was found to be most effective in increasing cessation rates in those with less years of formal education is your knowledge of the cessation rates or the quit rates as they were observed in blue-collar workers; is that correct?

MR. BURTON: Object to the form.

THE WITNESS: That's correct. That's what came to mind. But I have such a sharp recollection of looking at the different education levels, I'm wondering why I don't see it. So maybe I should look a little bit more closely, because I thought I might have done something like that. But let me just take a second and

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see if I can find something like that.

Okay, I found what I vaguely remembered, and so I can point it out to you.

BY MR. FORESTA:

Q Okay.

A In the tab 65 materials, I have an analysis, and there may be other places like this, but here's one I found, where I look at the COMMIT data, but I also include a variable for education, and I see no different effect for different levels of education on quitting.

Q Going back to Exhibit 11, Dr. Wecker, which is the printout of the file directories --

A Just a second.

Q Sure.

A Okay.

Q Can you point me to a specific file in that tab 65 folder that reflects the information that you just testified to?

A Okay, just a second. Okay, the second-to-the-last file, nqr3s_commit.log

Q What is that an analysis of, Dr. Wecker?

A That's the analysis of the COMMIT data where one aspect of the analysis is to include variables for different education level.

Q Okay. Can I ask you to turn to the 1995 report, Exhibit 2.

A Okay.

Q And if you'd turn in particular to page 189 --

A Okay.

Q -- in the section in the first column entitled "Discussion."

A Okay.

Q The first sentence says, "The COMMIT intervention did not significantly affect the primary outcome measure -- quit rates among heavy smokers -- where quitting was defined as having smoked no cigarettes for at least the preceding 6 months at the end of the trial." Do you see that?

A Yes.

Q Do you agree with that statement?

A Yes.

Q If you take a look in that same column, move to the next paragraph, it says, "There was, however, a statistically significant intervention effect in the light-to-moderate smoker cohort -- quit rates of 0.306 versus 0.275 -- with the mean difference showing an additional 3% of such smokers quitting." Do you agree with that statement?

A Well, I'm going to have to look here. I believe all of the analysis I have is on the combined group rather than breaking them apart, but let me take a second and see if I have something on that.

Q Okay.

A Oh, yes, okay, I found something here, and I'll tell you about it, if you want.

Q Yes, please.

A I'm looking in the materials in my tab 70, and the first thing I'll point out is that this is yet another place where I have an analysis that involves different levels of education, but it's essentially the same kind of thing I told you about, but it's a different computer output. Then, that same -- just turning the page, then we -- I have here a number of cigarettes smoked daily, and I don't see any significant effects from -- let me look here for a second. Okay. I'm just analyzing this output. I see a difference in quit rates as between heavy and light smokers, but I don't see it as arising from the intervention.

Q You see it -- I'm sorry, you see a difference in quit rates between the population that was subjected to the intervention and the comparison group; is that what you're saying?

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A No, I do not. I didn't say that.

Q What is the difference that you see in your data?

A I see that there's higher quit rates among light smokers compared to heavy smokers. That seems to be true here on the data, but that doesn't seem to be explained by the intervention.

Q Okay.

A Apparently it's just a difference in the population.

Q Here's my question. I'm sorry, did you finish your answer?

A Go ahead.

Q Here's my question to you: Do you dispute, Dr. Wecker, that there was "a statistically significant intervention effect in the light-to-moderate smoker cohort -- quit rates of 0.306 versus 0.275 -- with the mean difference showing an additional 3% of such smokers quitting"; do you disagree with that statement?

A Yes, my analysis here doesn't show that. And I'm referring here to the material in tab 70.

Q And tab 70 was an analysis of the difference in quit rates between the intervention cohort and the comparison cohort focusing specifically on

light-to-moderate smokers; is that correct?

A It included a variable for more than 25 cigarettes a day, 15 to 24, 5 to 14, and less than 5.

Q Did you run an analysis, Dr. Wecker, to determine whether there was a statistically significant difference in the quit rates for light-to-moderate smokers in the COMMIT study?

MR. BURTON: Object to the form.

THE WITNESS: I ran the analysis I'm describing to you, and it shows no such effect.

BY MR. FORESTA:

Q And this is the analysis that's set forth in tab 70; correct?

A That's right.

Q And is the disclosed spreadsheet, Exhibit 12 to your deposition, a summary of the output of those calculations?

A Just a moment. Yes.

Q Can you point to me where on this Exhibit 12 in this chart there is a reference to the difference in quit rates between the light-to-heavy -- excuse me, light-to-moderate smokers in the intervention group versus the comparison group?

A It's hard to point. You're in New York. How

do we want to do this?

Q Well, why don't we start with which page it's on.

A First page. I'm sorry, I took the "point" literally. It's late in the day. I can direct you to it, and I assume that's what you mean.

Q That's what I mean.

A Yeah. The first page, up at the top, where you'll see, on the left side, it says "Comparison" and "Intervention."

Q Yes.

A And then you want to move over toward the middle, and you'll see a column heading called "P-value," and below that --

Q Yes.

A -- a number, .11, and that's what's telling us there's no significant effect here. And in --

Q Where does it make any reference to light-to-moderate smokers?

A That's one of the variables that is a part of this analysis, and you don't see that until you turn the second page, and it's at the top.

Q Okay. The second page at the top it says "Cigarettes smoked daily in 1988." That is an analysis

that you ran to compare the quit rates -- or that's a reflection of the analysis that you ran to compare the quit rates in the light-to-moderate smokers group?

A Yes, that's a variable that reflects the intensity of smoking, and that's what the "light-to-moderate" and "heavy" concept is all about.

You guys probably got to eat dinner before you started this. We didn't. Can you give me a schedule?

Q Yeah. Well, we can break for a bite to eat, but let me just finish the questions on this, because I don't understand some of this information.

In the category for cigarettes smoked daily in 1988, in that subsection, it is broken down by the amount of cigarettes smoked per day, smoked daily in 1988; correct?

A Yes.

Q And the light-to-moderate smokers are covered in the categories 5 to 14 cigarettes smoked daily, and less than 5 cigarettes smoked daily; correct?

A The light-to-moderate labeling is not part of this. This variable simply has the elemental information of number of cigarettes smoked daily.

Q And all of this information comes from the 1997 study which is a study assessing predictors of smoking

cessation; correct?

A No, this data comes from the COMMIT data.

Q All right. I'm just looking at the first page in the title, "Falise: Predictors of Smoking Cessation Between 1988 and 1993 as Reported by Hymowitz (1997; Table 2)." I think you testified before that this, at least in the first two columns, is a duplication or a replication of the first two columns of Table 2 in the '97 report; isn't that correct?

A That's true, but what I tried to be clear about is that's not where the data comes from. I thought you asked -- I don't want to quarrel, but I thought your question had to do with where the data comes from. The data doesn't come from that article; it comes from the CDs.

Q The 1997 article, however, does not compare or does not evaluate the effect of the COMMIT intervention on smoking quit rates; isn't that correct?

A I don't -- I thought it did. I don't understand what you mean.

Q It's your testimony that the 1997 study is an evaluation of the effect of COMMIT intervention on quit rates; is that your testimony?

A Your question so puzzles me. I'm trying to

figure out what you could possibly mean. This is -- the '97 article is just one more article in the COMMIT series, and the COMMIT study is certainly about quit rates. So I must be missing something. Why do you think it is not? I don't mean to ask you a question.

BY MR. FORESTA:

Q Dr. Wecker -- I'm sorry, did you finish your answer?

A I'm finishing the answer, but mostly I'm indicating I must not understand the question.

Q Okay. Isn't it true, Dr. Wecker, that the purpose of the 1997 study was to identify variables predictive of smoking cessation in a cohort of cigarette smokers followed for five years?

A Well, I don't see where you're reading, but I'm looking at the front page here where it says "Objectives," and the objectives, it says, are "The primary hypothesis of COMMIT" -- I'll skip the parentheses -- "was that a community-level, multichannel, 4-year intervention would increase quit rates among cigarette smokers, with heavy smokers (more than 25 cigarettes per day) of priority." That's what the objective is.

Q Are you reading from the 1997 study or the 1995

study?

A Oh, sorry, I'm on the wrong study. Let's start this over again. No wonder I'm lost.

Q Well, all right. You were reading from the 1995 study?

A Yes, I was on -- I think you were asking about the other one, so I'll go to the other one. So can we start over on this?

Q Yes. It is a fact, Dr. Wecker, isn't it, that the objective of the 1997 study was to identify variables predictive of smoking cessation in a cohort of cigarette smokers followed for five years?

A Yes.

Q And the purpose of the 1995 study was to evaluate or assess the effect of a smoking education program on quit rates observed in an intervention group and a comparison group; isn't that correct?

A I agree, except I think I'd call it intervention. You said education, and, of course, the intervention included more than that, but basically I agree.

Q Okay. Before we get into too much more detail in the '95 and '97 study, I understand you'd like to take a break to grab something to eat.

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A Well, it depends on what your schedule is. It's going on 10 o'clock where you are. I don't know how much longer you want to go.

Q Well, I'd like to go until I finish, and I think that's going to be about another hour of questioning.

A If you do an hour, I'll keep going, and you can get to sleep earlier, and I can go home.

MR. FORESTA: Good. Can we just take a quick five-minute break, though, and I will take care of business here?

THE WITNESS: Sure.

THE VIDEOGRAPHER: The time is 6:43, and we're going off the videotaped record.

(Recess.)

THE VIDEOGRAPHER: This marks the beginning of Videotape No. 3 in the deposition of William Wecker. The time is 7:00 p.m., and we're back on the videotaped record.

BY MR. FORESTA:

Q Dr. Wecker, when you ran your calculations yesterday on the COMMIT data using the CDC-recommended method, did you find a difference in the quit rates between those people involved in the COMMIT

interventions versus the comparison group?

A Yes, but not a significant one.

Q What was the difference that you found?

A .011.

Q .011?

A Yes.

Q And is it your testimony that that was not a statistically significant finding?

A That's correct.

Q In running that calculation that resulted in a finding of .011 difference, did you consider the entire population of 20,000-plus people in the COMMIT study?

MR. MINTON: Object to the form.

THE WITNESS: Let me see if I have a sample size here, but I think that's about the right number. I just don't see it printed out. 20,000 is the right neighborhood. I've got the numbers here by city. It would take five minutes, but I could add them up, but you can add them up yourself, if you want. It's in tab 74.

BY MR. FORESTA:

Q Tab 74 it's in?

A Yes.

Q No, you don't need to do that calculation right

now.

A Let me tell you, during the break I had a moment, and I found the analysis I was looking for earlier, on the individuals with no college that you were asking about.

Q Okay, where does that exist?

A It's buried in tab 70, on the ninth page, as I printed it out, but it's part of the file cascade.lst.

Q Could you turn to your expert report, which is Exhibit 1?

A Okay.

Q In particular, page 2.

A Okay, I have it.

Q You state, in the second sentence under Roman numeral I, that Dr. Cummings' 1995 published analysis was refined in his 1997 published analysis by considering other factors that influenced the smoking quit rates such as gender, age, income and alcohol use. Do you see that?

A Yes.

Q Is it your opinion, Dr. Wecker, that the 1997 report is a refinement of the '95 study?

A Yes, I think that's -- it's a generalization, but it's fair, I think.

Q Well, is there anywhere in the 1997 report, which is Exhibit 3, where it says, "This is a refinement of the '95 study"?

A I -- if you want me to take the time to look, I can do that, but I didn't mean to be quoting it. I was giving you my impression that -- whereas in the '95 study, they did not employ any correction for confounding variables. In the '97 study, they quite sensibly go ahead and do that, so I would call that a refinement. If you want me to take the time, I'll look and see if it's -- they use that word, but it doesn't seem like --

Q Let me ask you a different question. Isn't it true, Dr. Wecker, that the purpose of the '95 study and the '97 study are different?

A Just a second, we'll get this phone out of the way.

(Interruption in the proceedings.)

THE WITNESS: Well, there are similarities and differences, they're both talking about exactly the same study, and they -- so in that sense, there's similarity. And then the '97 study goes on to do more than the '95 study had done.

BY MR. FORESTA:

Q The 1995 study is an effort to evaluate the effect of an intervention program on smoking quit rates; correct?

A '95?

Q Yes.

A Yes.

Q And the 1997 study -- the purpose of the 1997 study is to identify variables predictive of smoking cessation in a cohort of cigarette smokers followed for five years; isn't that correct?

A You're reading correctly, but it's the same cohort. They're both talking about the same people, the same study.

Q The purpose of the analysis in the 1995 study is different than the purpose of the analysis in the 1997 study; isn't that correct?

A I've answered that. I'd say there are similarities, strong similarities, and there are some differences. Obviously it's -- the '97 study picks up where the '95 study leaves off and does some more things. I grant you that.

Q Dr. Wecker, the purpose of the 1997 study was not to reevaluate the effect of the smoking education program on smoking quit rates, was it?

A Well, you've read part of the abstract that talks about the objective. The objective being to -- to employ these other predictive variables, but you need to realize that -- what are they predicting? They're predicting the smoking quit rates, so it's not like they've moved on to a new topic. This is all the same people, same subject, quit rates in the intervention versus the nonintervention communities.

MR. FORESTA: Can you read my question back, please, Madam Court Reporter.

(Record read.)

BY MR. FORESTA:

Q Can you answer that question, sir?

MR. UGARTE: Objection. Asked and answered.

MR. MINTON: Objection. Asked and answered.

MR. FORESTA: No, it wasn't.

Q Can you answer that question, Dr. Wecker?

A Yes.

MR. MINTON: Same objection.

THE WITNESS: I thought I was clear enough already, but I'll try it another way.

Both papers are talking about exactly the same thing, the smoking quit rates in this particular study that goes by the name of COMMIT. They both are

addressing the effect of the intervention. One of them, the '97 study, is a little more refined in that it goes on to employ some additional variables. That's my reading of these -- the relationship of these two studies.

BY MR. FORESTA:

Q Dr. Wecker, the effect of the COMMIT intervention was not one of the many predictors of quit rates that was evaluated in the 1997 study, was it?

A Oh, yes, it was. It wasn't printed out, but it certainly was.

Q Show me where in the 1997 report there is a reference to the COMMIT intervention as a predictor of quit rates?

A Page S60 at the bottom of Table 2, where you can read "Adjusted for COMMIT intervention status." That --

Q Before -- I'm sorry.

A Let me finish that up. That's referring to the COMMIT intervention status variable.

Q Can you take a look at page S58, please, in the second column, about three-quarters of the way down.

A Okay.

Q There's a sentence that says, "The effect of

the COMMIT intervention on the quit rates among cohort members has been described elsewhere." Do you see that?

A Not yet. Which paragraph heading is it?

Q "Analysis Methods."

A Okay, just a minute.

MR. MINTON: What else is on that page, because the page numbers don't really come through on the copy we have.

MR. FORESTA: It's actually the second page of the study. In the upper left-hand corner it says "Methods," in bold.

MR. MINTON: Got it.

BY MR. FORESTA:

Q Did you find the section I was talking about, Dr. Wecker?

A No. I've got the right page, I think, but I didn't see the part you were reading.

Q Okay. Do you see two-thirds of the way down on the right-hand column, there's a heading that says "Analysis Methods"?

A Yes.

Q If you go down ten lines, the tenth line starts with the word "smoking"; do you see that?

A Yes.

Q The first full sentence on that line states, "The effect of the COMMIT intervention on the quit rates among cohort members has been described elsewhere."

A Yes.

Q Do you see that?

A Yes, I agree with that.

Q Okay. If you move down another five lines, it's a line that starts with the word "of less" -- the words "of less."

A Okay.

Q You see the sentence that says, "To take account of this effect, the relationship between individual-level predictors of smoking cessation are adjusted for the effects of the COMMIT intervention"? You understand that that is what the authors of the 1997 study did, they adjusted for the effect of the COMMIT intervention before considering the other variable predictors that are assessed in this study; isn't that correct?

A No, that's not the way they did it. Just a minute, I dropped the microphone.

No, I don't think I can accept your explanation of what they did, so why don't you ask another question.

Q Why don't you tell me, Dr. Wecker, what it is

that they did to account for the COMMIT intervention?

A They just included it as a variable, along with all the others, as makes -- the only thing that makes sense here.

Q What was the relative risk of -- strike that question.

What is the data that was derived from this study for the population involved in the COMMIT intervention? Where is that listed on Table 2?

MR. BURTON: Objection.

THE WITNESS: I don't understand the question.

BY MR. FORESTA:

Q Do you see Table 2, which is -- appears on page S60?

A Yes.

Q And Table 2 sets forth a series of characteristics that were analyzed by the study authors; correct?

A Yes, these are the right-hand side variables that they looked at.

Q And those include things like sex, age, race annual household income, and other things; correct?

A Yes.

Q Where do you see the characteristic

"participation in COMMIT intervention"?

A Well, you see that in the footnote, where it says "Adjusted for COMMIT intervention status."

Q The entire regression analysis was adjusted for participation in the COMMIT intervention; isn't that correct?

A That's true, just as it was -- the entire regression analysis was adjusted for sex or age or race or any of the other variables.

Q And what are the results that they found after they adjusted it for the COMMIT intervention status?

A Which results? I don't understand.

Q The results when they did the regression analysis for -- and considered the characteristic "COMMIT intervention status."

A Yes. Well, you're looking at some of the results right here in Table 2. Is there a particular result?

Q I'm looking at --

MR. FORESTA: Are you asking what was the odds ratio for not being in an intervention community?

MR. FORESTA: That's a far more specific question than I asked, Mike.

Q But what I want to know now is: Where can I

find the results that relate specifically to COMMIT intervention status?

A You can look at my replication on -- let me find it here. Actually, we've talked about it before. You and I were discussing tab 70, the first page, and so we've already been to this spot.

Q Okay. Where in the article, the 1997 article, do you find those results?

A Well, all of the results for the variables printed in Table 2 are found in Table 2, but the result for the COMMIT variable is not shown in Table 2, and that's why I did the replication, to show what it was.

MR. MINTON: Why do you suppose --

BY MR. FORESTA:

Q Do you agree with me --

MR. MINTON: Why do you suppose the authors of that study would -- well, never mind.

BY MR. FORESTA:

Q Dr. Wecker --

A Yes.

Q -- you would agree with me that there is no data published in this report, no numbers in this report on Table 2, or anywhere else, that show the results of the regression analysis run on COMMIT intervention

status as a predictor of quit?

A Yes, the table --

Q Show me where that is.

A Table 2. But what's not on Table 2 is one of the variables named COMMIT, but the regression analysis using COMMIT is the regression that's reported in Table 2; it's just that Table 2 doesn't report everything about it. And that's why I did a more complete printout and show you that on tab 70.

Q Recognizing that COMMIT interventions had an effect on quit rates, the authors of the 1997 study specifically adjusted for that effect before considering the other predictors, isn't that correct?

MR. MINTON: Object.

MR. BURTON: Object to the form.

MR. MINTON: It's unanimous.

THE WITNESS: The variables that they considered were the ones that are in Table 2, including the one at the bottom of Table 2.

BY MR. FORESTA:

Q Recognizing that COMMIT interventions had an effect on quit rates, the authors of the 1997 study specifically adjusted for that effect before considering the other predictors; isn't that correct?

MR. BURTON: Object to the form.

THE WITNESS: Let me parse it out. The premise is no good, but the part about -- the last part does describe that -- it's not a very careful description, but it is a description of what you see in Table 2, which is a bunch of variables that are involved in a regression analysis on the -- as to their involvement in the quit rates, including the COMMIT variable, which is mentioned at the bottom of the page.

BY MR. FORESTA:

Q Have you reviewed the "Methods" section of this report, Dr. Wecker?

A You're talking about --

MR. BURTON: Which report?

THE WITNESS: Which report?

BY MR. FORESTA:

Q Exhibit 3, the 1997 report.

A Article, you mean. I've read the whole article.

Q Okay. In the "Methods" section, where do the authors describe what you just said they did?

A Well, that whole "Methods" section is background or general description about what they did. They start talking about the data and where it came

from.

Actually, I think this "Methods" section is really more talking about the COMMIT -- the methods in the COMMIT study. But they go on about the details of the data collection and the COMMIT study communities and -- it says "Outcome measures." They reference back to the 1995 study as the earlier study.

Q And then it says to take account of the effect of COMMIT intervention, relationship between individual-level predictors of smoking cessation were adjusted for the effects of the COMMIT intervention, doesn't it?

A You didn't read it quite right, but I've read that, yeah.

Q I wasn't quoting it, I was just characterizing -- or paraphrasing what it was that the authors did.

A Well, you left --

Q I paraphrased it correctly, did I not?

A Well, how can a paraphrase be correct? You paraphrased it, and I know what you're talking about, so I'm quite ready to go on with the next question.

Q If you continue on that column, Dr. Wecker, the last full sentence on -- or the last sentence on that

page starts with "Smoker characteristics evaluated in relation to smoking cessation included," and then they list of series of characteristics; correct?

A Yes.

Q The first of which is age and then gender and then it moves on to race/ethnicity. You see that?

A I do.

Q If you continue reading down the list, where do you see a reference to "participation in a COMMIT intervention"?

A It's not on that list, because it's not a smoker characteristic.

Q The smokers who were studied in the COMMIT study had various demographic characteristics; correct?

A Yes.

Q And those characteristics were all studied as potential predictors for quit rates in the 1997 study; isn't that correct?

A Well, I don't think it would be accurate to say all of them, but the ones that were studied were studied.

Q Okay. And before undertaking that analysis, Dr. Wecker, the authors of this study needed to account for the effect of COMMIT intervention on the 20,000-plus

people who were analyzed for purposes of this study; isn't that correct?

MR. MINTON: Objection. Asked and answered.

MR. BURTON: Object to the form.

THE WITNESS: No, I don't think you understand how they did it. They simply included the COMMIT variable along with all the others, and that's the sensible way to do it. I have no quarrel with that.

BY MR. FORESTA:

Q Would you say that participation in a COMMIT intervention program is not a smoker characteristic?

MR. BURTON: Object to the form.

THE WITNESS: Yes, I wouldn't think of that as a demographic characteristic. That's an aspect of the experiment. What I had in mind is the smoker characteristic is like whether they're male, how old they are, what their education is, that sort of thing.

BY MR. FORESTA:

Q And that's, in fact, what the authors of this study were investigating when they ran their regression analysis? Smoker characteristics; correct?

A Yes, they were looking at smoker characteristics.

Q And participation in the COMMIT intervention

program is not a smoker characteristic?

A That's right. That's why it wasn't on the earlier list, but it is one of the things they adjusted for.

Q Let's go back to your report, please.

A Okay.

Q The last sentence in the first paragraph says, "The result of Dr. Cummings's more refined analysis of the COMMIT data shows that the COMMIT intervention program had a statistically insignificant effect on the quit rate." Did I read that correctly?

A Yes.

Q That conclusion does not appear anywhere in the 1997 article which we've marked as Exhibit 3 to your deposition, does it?

A No, I didn't put my opinion in the article. I put my opinion in my report.

Q I just want to make sure that this is your opinion, not the opinion of the authors of the 1997 reports. It is not their opinion, is it, Dr. Wecker?

A Well, I don't know what all their opinions might be, but I didn't intend to be stating their opinions. I was stating my opinions based on my analysis.

Q Anywhere in the 1997 report, Dr. Wecker, does it state that the COMMIT intervention program had a statistically insignificant effect on the smoking quit rate?

A No, I don't believe they got around to pointing that out.

MR. FORESTA: I'll move to strike the nonresponsive portion of that answer.

Q I know it's getting late, Dr. Wecker, but if you could just answer my question, I'd appreciate it.

MR. MINTON: I think it was an answer.

BY MR. FORESTA:

Q Can you take a look at the second paragraph on page 2, Dr. Wecker, under your -- under heading Roman numeral I. Read that to yourself, please.

A The whole paragraph?

Q Yes, please.

A Okay, just a second. Okay.

Q The second -- excuse me, the third sentence states, "I analyzed the male members of the COMMIT population using the same methods that Dr. Cummings used in his 1995 paper." Do you see that?

A I think you misspoke.

Q I'll try it again. "I analyzed the male

members of the COMMIT population using the same methods that Dr. Cummings used in his 1995 paper." Did I get that right?

A I think you got it wrong again. It says '97.

MR. BURTON: You-all are reading different sentences.

THE WITNESS: Oh.

BY MR. FORESTA:

Q Third sentence, sir.

A I must be looking at the wrong spot, so help me out again.

Q All right. We're all getting a little punchy. Second

MR. MINTON: There's one that's just like that above it, but it does read 1995. If you'll look down, there's another one that says 1997.

BY MR. FORESTA:

Q Just looking at the third sentence of the second paragraph.

A Okay, I'm with you now.

Q "I analyzed the male members of the COMMIT population using the same methods that Dr. Cummings used in his 1995 paper."

A Okay.

Q Did I read that correctly?

A I'm with you.

Q All right. How did you undertake that analysis? Tell me what methods you used.

A Okay, just a second. Okay, I'll give you an answer; you may want to follow up for more details. But what I did was the same methodology as the '95 paper, as I've indicated, with one change. And the one change was that -- let me read this again. I'm not sure what sentence you're referring to, but I think it's the one about the male population, and with respect to that calculation, I simply restricted the input data to be men only.

Q Yeah, but what I want to know is, what were the methods that you used in analyzing this segment of the COMMIT population? You used the same methods that Dr. Cummings used in his 1995 paper --

A Right.

Q -- correct?

I would like you to explain, if you can, what those methods are.

A Okay. Leaving aside, then, the aspect of the method that I thought you were inquiring about, which is the difference, having to do with men versus men and

women, I'll set that one aside, and then all I'll have to explain to you is what Cummings can teach you, which is he how he calculates his 1.8 percent. Do you want me to go through how he does that?

Q The method that Dr. Cummings used to calculate the 1.8 percent is the same method that you used in coming up with your calculations for your analysis, the members of the COMMIT population, except for the fact that you restricted it solely to the male members of the COMMIT population; correct?

A Exactly. Exactly.

Q No other differences in the two methods?

A That's correct, it's the 1.8 percent method restricted to men only.

MR. MINTON: And we're talking specifically about this line of the report.

THE WITNESS: I've lost track of what line I'm talking about, but I'm trying to answer your questions.

BY MR. FORESTA:

Q Your analysis of the male members of the COMMIT study -- the COMMIT population?

A Yeah, the men-only calculation, right.

MR. MINTON: Well, as reflected in this sentence in the report.

THE WITNESS: Yeah, I've understood that as the context.

MR. MINTON: All right.

THE WITNESS: Judging by your repeated questioning, I figure I may be missing something in the question, but if I understood your question, I pointed to the right spot.

BY MR. FORESTA:

Q And how, if at all, Dr. Wecker, did you account for the missing data from the 1995 study?

MR. BURTON: Object to --

THE WITNESS: Well, the same way as Cummings, essentially it ignores the nonresponders.

BY MR. FORESTA:

Q It's your position that Dr. Cummings, in the '95 report, ignored the nonresponders?

A Yes.

Q What was the size of the sample that you studied when you looked at the members -- the male members of the COMMIT population?

A Oh, I'd have to add it up. I've got city by city, but I don't have -- I don't have it all added up. You could look in tab 72 and get a calculator out and add 44 numbers and you could get it.

Q Do you have a ballpark estimate of what percentage of the total 20,000-plus members of the COMMIT study were male?

A It looks like about half.

Q So when you segregated out the men in analyzing the COMMIT data, you essentially took away one half of the population from the initial study; correct?

A Yes, the women.

Q And what was your basis for analyzing only the male members of the COMMIT population?

A I thought it would be -- have greater relevance to the issues in this case.

Q Why was that?

A Because the claimants in this case -- or discussed in this case are predominantly male.

Q In the 1995 study, Dr. Wecker, there was no statistically significant difference between men and women in the effect of the COMMIT intervention on their quit rates; isn't that correct?

A I would expect not, but I'd have to get the article out, see where you're referring to. But I would -- that's what I would expect.

Q You would expect what?

A That there would not be a difference, neither

one had an effect.

Q That wasn't my question. If you take a look at page 189 --

A Okay, just a minute.

Q -- of the '95 study --

A One second. Okay.

Q If you look in the second column, about halfway down, there's a paragraph that starts with the words "The analyses."

A Yes.

Q The full sentence -- or actually the first portion of the sentence says, "The analyses here showed little difference between men and women in the effect of the COMMIT intervention." Do you dispute that finding?

A No, I'm not disputing that.

Q So if there was no difference between the effect on men and women, why is it that you thought it was necessary to exclude women from the population that you analyzed?

MR. MINTON: Object to the form of the question.

MR. UGARTE: Objection.

THE WITNESS: It didn't say "no difference." It said "showed little difference," and I've already

answered that I thought looking at the men made better sense in the context of this case because the claimants are predominantly male.

BY MR. FORESTA:

Q By looking only at the men, Dr. Wecker, you decreased the statistical power of the COMMIT study, did you not?

A Not as it applies to men.

Q How about as it applies to the entire population of people studied in the COMMIT study?

A I would -- I agree the sample size is smaller when you look at men as opposed to men plus women, and in that respect, I agree with you. But the sample size is still very large, and the study is quite capable of detecting effects, if there are any, even for just men.

MR. FORESTA: I'm sorry, I missed the last -- the tail end of that response. Can you have that read back, please.

(Record read.)

BY MR. FORESTA:

Q Is it your opinion, Dr. Wecker, that gender is a confounder in evaluating the quit rates in the '95 COMMIT study?

A It's at least a potential confounder. I'd have

to look at my other output to see how big a deal it is, but it's one of the things you'd want to think about for sure, and --

Q Did you --

A Let me finish up.

Q Sir, I'm sorry.

A And certainly the '97 article recognizes that it's one of the variables you'd want to take into account, and the COMMIT study itself, the very fact that they record that information reflects that it's a variable that would be of interest.

Q But the very fact that they recorded it does not establish that it's a confounder, does it?

A That's right. It's a covariate that would be an obvious one to consider. I've now turned to a resource here, and it looks like it is a significant covariate based on the analysis here.

Q What are you talk- -- what are you referring to now?

A I'm looking on Table 2 from the '97 article to notice a difference in the effects of men -- between men and women.

Q Is there anything in the 1995 study that says that gender is a confounder in evaluating quit rates

among members of the intervention cohort versus the comparison cohort?

MR. MINTON: Take your time, look at --

BY MR. FORESTA:

Q I'm focusing strictly on the '95 report.

MR. MINTON: Go ahead and look.

THE WITNESS: Oh, '95 only. I'm sorry, I didn't hear that. Well, I'll have to go through that report again. Just a minute. You really want me to take the time to do that? I mean, it's either in here or it isn't, but if you want me to go through it, I'm going to take another ten minutes to go through the whole thing again.

BY MR. FORESTA:

Q Do you know, can you point to me a section here, without reviewing it, do you know whether in the 1995 study there is evidence that gender is a confounder in evaluating quit rates?

A I don't think in '95, because they didn't study that until '97. But there's certainly an indication that they're aware it is a covariate, and they mention it on Table 2 of the '95 article.

Q Let's move on to the next paragraph on page 2 of your report, Dr. Cummings (sic), where you discuss

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your analysis of blue-collar male members of the COMMIT population. Do you see that?

A The next paragraph?

Q Yes.

A Just a minute.

Q It starts on the bottom of page 2 and then carries over.

A Okay, I'm with you.

Q All right. What was the sample size of blue-collar male members that you studied?

A Well, I'll see -- I think I can get you that. Just a minute.

Well, I can refer you to the analysis, but the numbers are printed out separately for every city, so I'd have -- and again, separately by heavy versus light to moderate, so I'd have to add 44 numbers to get that for you.

Q Do you have any reason to disagree with me, Dr. Wecker, that male blue-collar workers comprise only 25 percent of the total population studied than the '95 analysis.

A That looks about right.

Q And when you studied or when you analyzed only 25 percent of the COMMIT population, when you looked at

the blue-collar male members, you decreased the statistical power of the COMMIT study, did you not?

A The first part of the question again, please. When I did what?

Q When you analyzed or studied the blue-collar male population of the COMMIT study --

A Okay, I got you. Not -- no, not with respect to conclusions to be reached about blue-collar men only. That's --

Q What about with respect to conclusions to be drawn about the population as a whole and the effect of COMMIT interventions on quit rates?

A Ah, for that you wouldn't look at blue-collar men only, I agree; you'd look at the population as a whole.

Q But in looking at only 25 percent of the population and then determining whether there was a statistically significant correlation between a COMMIT intervention in quit rates -- strike the question. Way too late to be asking that kind of question.

Dr. Wecker, do you agree that 25 percent of the population studied in the COMMIT study was classified as retired?

A I don't have that number in my head, so I can't

tell you that.

Q Do you have any idea of what population or what percentage of the COMMIT population study was classified as retired?

A No, I just don't have that number in my head, I'd have to look at the underlying data.

Q The COMMIT study did not track prior work status for retired people, did it?

A I don't think so, but I'm just not able to recall that detail, so I can't answer that with assurance.

Q Did you undertake any analysis to try to determine what percentage of the people classified as retired were former blue-collar workers?

A I don't think so, no, nothing is coming to mind.

Q Are you aware that in the retired population, education level was overweighted towards high school education or less?

MR. MINTON: Object to the form of the question. Are you talking about a classification that lies within occupation group?

MR. FORESTA: Blue-collar workers as Dr. Wecker has analyzed.

MR. MINTON: No, I'm -- I'm confused.

MR. BURTON: Object to the form.

MR. MINTON: Object to the form. I'm confused by the question. Are you suggesting that retired was an occupation group --

MR. FORESTA: No.

MR. MINTON: -- variable?

MR. FORESTA: No, no. What I want to know is whether Dr. Wecker did any analysis of the retired people to find out what their prior work status was.

THE WITNESS: No, I don't believe I did.

BY MR. FORESTA:

Q My next question -- I'm not sure whether I got an answer to this, Dr. Wecker, or not, and I apologize if you did answer it, but are you aware that in the retired population, where the segment of the COMMIT study classified as retired, the education level was overweighted towards high school education or less?

MR. BURTON: Object to the form.

THE WITNESS: Yeah, I don't know what you mean by "overweighted."

BY MR. FORESTA:

Q In proportion to the education level for the COMMIT study as a whole, do you have any idea what the

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education level was for those who were classified as retired?

A No, I didn't study that group separately.

Q Can we flip to page 3 of your report, please.

A Yes.

Q The first full paragraph that's on that page.

A Okay.

Q Can you read that to yourself, please.

A Okay. Okay.

Q Is it your opinion, Dr. Wecker, that there was a statistically significant difference in the baseline quit rates between the intervention communities and the comparison communities?

A No, I'm not expressing that opinion.

Q And, in fact, there was no statistically significant difference between those baseline quit rates; isn't that correct?

A I'm not sure I investigated that, so I can't tell you that as a fact.

Q Well, you took into account what you believed to be a difference in the baseline quit rates in doing your analysis, didn't you?

A Yes, I did that.

Q And you did that without analyzing whether that

difference was statistically significant?

A That's right, because that's the way to do it.

Q The second full sentence of this paragraph says, "I found that the intervention communities had higher smoking quit rates in the control communities even before the COMMIT intervention." Where did you find that, Dr. Wecker?

A Just a moment, I'll get you that. I've got a phone ringing here. Turn that thing off.

In the Monograph 6.

Q Do you have Monograph 6 in front of you?

A Yes.

Q Do you know where in Monograph 6 that information came from?

A Yes.

Q Can you turn to it, please.

A Sure. Page 31.

Q And that's in Chapter 3 of the monograph?

A Yes.

Q Table 3 is not -- or does not reflect a survey of COMMIT participants, does it, Dr. Wecker?

A Depends on what stage of the participating you have in mind. So perhaps you could clarify.

Q At any stage of the COMMIT study.

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A Yes, I think it does. In the early stages, they were out identifying households, and this is where they were picking up this information. This information was gathered as part of the COMMIT undertaking.

Q Okay. And that's what you referred to as the rostering process?

A Well, that's a term that the COMMIT people have used and I've just picked it up. I don't think they've defined it so precisely that I could define it for you, but it certainly means the early stage of the COMMIT work as opposed to the four-year follow-up part.

Q And no ex-smokers were included in the COMMIT study to determine the effect of an intervention program on quit rates; isn't that correct?

MR. MINTON: Object to the form of the question.

THE WITNESS: I don't understand that question.

BY MR. FORESTA:

Q Well, why would you include an ex-smoker in the COMMIT study when your goal is to assess the effect of an intervention program on quit rates?

MR. MINTON: Ask the people who designed the evaluation cohort and put them in there.

MR. FORESTA: Can you not provide gratuitous

answers like that, Mike?

MR. MINTON: It's a little frustrating to mis- -- when you misrepresent what's going on.

MR. FORESTA: I'm not misrepresenting anything. I'm asking him a question.

MR. MINTON: Well, yeah you are. There are at least 50 or a hundred ex-smokers in the COMMIT cohort. You know it, I know it, everybody in the room knows it.

MR. FORESTA: I asked Dr. Wecker that, and I didn't get an answer from him.

Can you please reask the last pending question.

(Record read.)

BY MR. FORESTA:

Q Can you answer that question, Dr. Wecker?

MR. BURTON: Object to the form.

THE WITNESS: I didn't do that. If you want to ask people's motivations who did that, you'd have to talk to somebody other than me.

BY MR. FORESTA:

Q You don't have an answer to my question, do you?

A I just gave you my answer, which basically says I'm not the right guy to be answering the question.

Q The answer to my question is no, you don't have

an answer?

MR. MINTON: Object to the form.

THE WITNESS: I don't think you're being fair there. I tried to give you the best answer I had.

BY MR. FORESTA:

Q Is it your opinion, Dr. Wecker, that the communities in the COMMIT study were not well matched?

A Oh, I think that's a -- it's my opinion they could never be perfectly matched, that's for sure, but --

Q Makes the effort to match. Well matched.

A Well, I'm trying to struggle with this concept of well matched. It's easy on the extremes that they're certainly not perfectly matched, and because of that, you have to worry about differences between the cities, there's no question of that, but the study authors made some effort to make the cities comparable, so, for example, they didn't match Vallejo with New York.

Q Are you aware, Dr. Wecker, of the role that the National Cancer Institute played in the COMMIT study?

A No, not -- I'm not aware of the specific role they played.

Q Turning back again to your expert report, Dr. Wecker, Exhibit No. 1, in that same paragraph we

were on, on page 3.

A Okay.

Q You state that "When I refined the 1995 analysis by controlling for the quit rate differences between the intervention and control communities prior to the intervention, I found that there was no significant intervention effect." Did I state that correctly?

A Yes.

Q How was it that you went about controlling for the quit rate differences between the intervention and control communities?

A By looking at the change in quit rates or change in differential quit rates in city pairs in the intervention period compared to the preintervention period.

Q Where did you find that information?

A The preintervention period was in Monograph 6.

Q And the intervention period came from the COMMIT data; is that correct?

A Right.

Q And then what did you do to come up with your control? Did you simply subtract the preintervention numbers from the numbers that were found in the

intervention period?

A Right.

Q Did you do anything else?

A No.

Q Why is it that you took into account the preintervention quit rates when you did your analysis of the intervention period quit rates?

A Because the effect of an intervention would have to be the incremental effect from what the status was before the intervention, and so I looked at what the status was before the intervention.

Q In order to do that, would the population of people who were in the -- who were involved in the preintervention period have to be the same as those who were studied during the intervention period?

A No.

Q It wouldn't matter if the population of people who quit smoking prior to the intervention were all women, for instance?

MR. BURTON: Object to the form.

THE WITNESS: I'm not following the question. I'm sorry.

BY MR. FORESTA:

Q Do you know anything about the population of

people who were surveyed in the preintervention period in the COMMIT study, Dr. Wecker?

MR. UGARTE: Object to the form.

THE WITNESS: We know what the Monograph 6 tells us about it. They're the same cities that the COMMIT research group continued to study with their work that continued into the 1990s.

BY MR. FORESTA:

Q And what else do we know about them other than what city they lived in?

A Well, I can see what else the monograph has to say about that. Just a minute. Well, there's a table with sociodemographic characteristics of the communities on page 29. And there's the description of the random sampling approach for the contacts and the various sample determinations that the COMMIT people made. That's --

Q Where does that appear? I'm sorry, where does that appear?

A I was looking at the bottom of page 30 where it says "to identify residents to be tracked." Your question says what do we know about the residents, but what we know about the residents in part comes from the samples that we take from them and study, so I thought

I'd mention that.

Q What do we know about the people who quit smoking in the COMMIT communities prior to the COMMIT interventions?

A Well, I can't give you any details on that as I sit here. I can tell you quit rates by city, because that's sitting here in Monograph 6.

Q Right.

A And it's possible, but I don't know, that there might be some other details to be found in the large databases that we have on CD, but nothing else comes to mind on that. I can go look at that tomorrow, perhaps.

Q Next paragraph on page 3, Dr. Wecker.

A Just a moment.

Q Can you read that to yourself, please. Again, this is referring to your Exhibit No. 1, the expert report.

A Okay, I've read that.

Q Is it your opinion, Dr. Wecker, that efforts to increase taxes as part of the COMMIT study had an effect on the quit rates that were observed?

A They would, I would expect, where they were large and successful, but just by first principles, but since the quit rates that we observe are essentially the

same in the intervention and nonintervention communities, it looked like, when you sum it all up, that must not have had an effect.

MR. FORESTA: Can you read that answer back again. I'm losing my train of thought.

THE WITNESS: So am I.

(Record read.)

BY MR. FORESTA:

Q Just so I understand it, it is your opinion that efforts to increase taxes as part of the COMMIT program did not have an effect on the quit rates observed?

MR. BURTON: Object to the form.

MR. UGARTE: Object to the form.

THE WITNESS: That's what I said. I was simply referring to the point we've been discussing for some time, that the intervention communities and the control communities appear to be essentially the same in terms of quitting, so you can't parse out the effect of the intervention, because it's composed of so many different parts that it can't be separated. But if I can use the final result as an indication, I would suppose that there were no large, successful tax changes that were actually implemented, at least they must not have been

large enough to have an effect, because I don't see an effect.

BY MR. FORESTA:

Q What efforts to increase taxes as part of the COMMIT program are you aware of?

A I didn't study any of that in detail. I did look through the list of things that were described. I don't have my materials here that were disclosed. I'll call it the Cummings disclosure materials, but they go on in a little more detail about the various aspects of the various pieces of the intervention. So all that meant -- all that said, I didn't have much detail for you on that.

Q Is it your belief that the Cummings materials contain information about efforts to increase taxes in the COMMIT communities?

MR. UGARTE: Object. We should clarify what we're talking about "the Cummings materials"?

MR. FORESTA: That was a phrase that the witness used.

MR. UGARTE: And I think we should clarify it in our asking another question.

MR. FORESTA: I don't know what the Cummings materials are.

MR. UGARTE: That's the point.

MR. FORESTA: He's referred to it --

Q Dr. Wecker, you know what the Cummings materials are, don't you?

A Yes, I meant all the materials that came to me in the context of my work that you're asking me about. It was pile of about 8 inches of stuff.

Q And is it your belief that those materials contain information about efforts to increase taxes in the COMMIT communities?

A Well, I thought that was true. And I'm trying to think at this late hour where I can look in the materials I have here where they list all the different things they try to do. Let me just look here.

MR. MINTON: You do cite four pages here from Monograph 6 as well.

THE WITNESS: Okay. Here's a spot. It's page 42 of the Monograph 6. I reference page 41 in my footnote on the place we were just reading, and I see that the sentence carries over. It says "Factors that can influence smoking rates include cigarette taxes," and it names some other things.

BY MR. FORESTA:

Q I'm sorry, I didn't have the monograph in front

of me when you started giving your answer.

A Okay.

Q You're talking about the bottom of page 42?

A 41. The last line on page 41 that begins "Factors that" -- this is all in the context of a bunch of different intervention methods, and it --

Q Okay.

A -- says "factors that," and you turn the page, "can influence smoking rates include," and one of them that are mentioned here is cigarette taxes. I suspect there are other places if I -- if you want to give me the time, I'll look for other places like -- that mention cigarette taxes.

Q What you just read, though, Dr. Wecker, is not evidence that there were any increases in taxes as a result of the COMMIT study; correct?

MR. BURTON: Object to the form.

MR. UGARTE: Objection.

THE WITNESS: That's correct.

BY MR. FORESTA:

Q What evidence do you have that there were any increases in taxes resulting from the COMMIT study or as part of the COMMIT study?

A I didn't -- it may be getting late here, but I

don't remember saying that. My report talks about efforts.

Q Um-hmm, I understand.

A It doesn't --

Q And what I'd like to know now is, are you aware of any evidence that taxes were increased as a result of the COMMIT program?

A Not off the top of my head here. It may be that in the materials I didn't bring, there's -- because I do recall some -- there was some further details there, but actually implementing tax increases, I can't point you to a spot. But I did answer earlier that it doesn't look like there could have been any big tax increases implemented, because I just don't see any effect. And I would expect large tax increases would have an effect, and since I don't see an effect, maybe that there weren't any.

Q What's the basis for your opinion that large tax increases would have an effect on quit rates?

A Just the demand curve sloped downward.

Q You make reference to the COMMIT intervention involving constraints on advertising and promotion of tobacco products in that paragraph. Do you see that?

A Yes.

Q What evidence do you have of constraints on advertising and promotion of tobacco products as part of the COMMIT intervention study?

A Again, if you read the full sentence, it talks about effects of efforts to do these things, and the Monograph 6 in the areas -- the pages that I've cited in the footnote 10, and have been discussing with you just now -- and let me see if there's some pages, other pages here. Just a minute.

Okay, let me get my head straight here. We're -- I'm looking around here for constraints on advertising and promotion; is that right?

Q Yes, sir.

A Okay. And I would refer you to Monograph 6, and here I'm finding a vending machine ordinance proposal, that looks like it's essentially on target.

Q Where do you see that reference?

A That's on page 104. I'm just -- there's a section here that's very long on this topic, and I'm just trying to skim it.

Also at the bottom of page 104 it says an ordinance was ratified, so it's more than just an effort. Some on page 100 about Raleigh, North Carolina. This section is so long that I'm trying to avoid reading

it word for word, but the -- it begins "Changing public policy around tobacco control in COMMIT communities," and it goes on at length.

Q And what evidence do you have of the impact of these constraints on advertising and promotion of tobacco products on quit rates as they were studied in the COMMIT study?

A Oh, the evidence is the results. They apparently had no effect.

Q It's your opinion that efforts to constrain advertising and promotion of tobacco products had no effect on the quit rates that were evaluated in the COMMIT study; is that correct?

MR. BURTON: Object to the form.

THE WITNESS: If I understand the question, the answer is yes, that's the essential result of the COMMIT study, that they weren't finding effects on quit rates, at least -- leave aside the assertion that the 1.8 percent was marginally significant. I disagree with that. But my finding is and the essence of the COMMIT study, I think, is that they find either zero or a negligible effect on quit rates.

BY MR. FORESTA:

Q And the same holds true for restrictions on

smoking in public places?

MR. BURTON: Objection. Are you talking --

THE WITNESS: The same holds true for the composite of all the different aspects of the intervention. I think they -- I've forgotten the number, but number 58 strikes -- sticks in my mind. There were a large number of different undertakings, and the intervention is the sum total of all those, and it's the effect on quit rates, and I don't see effects on quit rates.

BY MR. FORESTA:

Q Okay. So whether you look at it as a whole, or whether you look at each one of these components individually, none of it, in your opinion, had an effect on quit rates as they were studied in the COMMIT study; correct?

A No, not correct. My point is you can't look at it individually; you can only look at it as a composite.

Q But you have no evidence that any one of those components of the COMMIT intervention had any impact on quit rates that were observed in the COMMIT study --

MR. MINTON: Objection --

BY MR. FORESTA:

Q -- correct?

MR. MINTON: -- asked and answered.

THE WITNESS: That's a double answer. No effect for the composite, and therefore, no effect for any portion, because you'd expect to see that in the composite.

BY MR. FORESTA:

Q Thank you.

A Are we finished?

MR. FORESTA: Why don't we take about a five- to ten-minute break, just so I don't completely derail the train, and then we'll finish up.

MR. BURTON: Steve, at this point, we've been going almost six hours on a short report, and we're going to cut this off in about --

MR. FORESTA: Fairly quick.

MR. BURTON: I'm just going to tell you, we're going to cut it off in about 30 minutes, if you --

THE WITNESS: Yeah, I'd be glad to keep going if you want. I don't need a break.

MR. FORESTA: No, I do. We're taking a break for me.

THE WITNESS: Okay.

MR. FORESTA: You don't have to take one.

THE VIDEOGRAPHER: The time is 8:12, and we're

going off the videotaped record.

(Recess.)

THE VIDEOGRAPHER: The time is 8:21. We are back on the videotaped record.

BY MR. FORESTA:

Q All right, welcome back, Dr. Wecker. We're in the home stretch.

A Okay.

Q Is it your opinion, Dr. Wecker, that the COMMIT study has generated data and conclusions that are externally valid to the population of the Manville Trust claimants?

A I take it that you mean by that, that the conclusions from the COMMIT study could be useful in applying to the Manville Trust claimants, and I --

Q Well, let me just interrupt there. You're familiar with the concept of external validity, are you not?

A Yes, but I didn't want to use a buzz word here when ordinary English would serve. And so I'll -- so I understand your question. I'm not having trouble understanding you. And the answer is that I think that the COMMIT data is a useful body of data from which one can make instructive statements about the Manville Trust

data, the claimant data -- perhaps I should just say the claimants -- especially if you restrict attention to make the two groups even more comparable by looking at the blue-collar males from the COMMIT data.

Q And what is the basis for that belief, Dr. Wecker?

A Well, one thing is that the COMMIT study is a randomized experiment, so I like the design of it, And the other is that if you restrict attention to people that are more similar to the claimants, you can't help but improve the comparison.

Q How many asbestos-exposed workers were studied in the COMMIT study?

A I can't tell you that.

Q That information is not available, is it?

A I'm thinking. I have a vague recollection there was something more detailed about the occupations there than just blue-collar status, but I'm afraid it's getting late, and I can't remember exactly what I'm trying to remember. In any event, I can't tell you what percent as I sit here.

Q You can't tell me what percentage of the COMMIT study participants were asbestos-exposed workers; correct?

A That's right, I'm remembering better now. There was -- somewhere in these documents there was a list of what the different occupations were that are subsumed under the category of blue collar, but I've forgotten where I saw that.

Q In your report again -- before we get back to your report, let me just ask you, have you ever reviewed any of the trust claimant files?

A I thought I was going to hear somebody object to that.

MR. MINTON: You mean in connection with the supplemental report?

MR. FORESTA: Yes.

THE WITNESS: Not in connection with the supplemental report.

BY MR. FORESTA:

Q In connection with the opinions that you've formulated that are set forth in your supplemental report.

A No, not in any respect in connection with the work I did that is the subject of this deposition.

Q But you have done it in the past for other purposes?

MR. MINTON: I object to the question. We're

not going into other work.

MR. FORESTA: We're not going into other work?

MR. MINTON: Yeah. We're talking about the work he did and the opinions he formulated in the supplemental report.

BY MR. FORESTA:

Q It's your opinion that the information, the data that was collected in the COMMIT study, is useful as applied to the Manville Trust claimants, is it not?

A Yes.

Q And what do you mean by "useful"?

A It's informative as to the effect or lack thereof of intervention or information programs on quitting.

Q Even though through your analysis of the COMMIT data you found no statistically significant effects of the COMMIT intervention on quit rates?

A That's true.

Q Now we'll turn to Exhibit No. 1, which is your expert report, and in particular, the last page, page 4, in your opinions under heading Roman numeral number II.

A Okay.

Q Can you read over the first paragraph, please --

A Okay.

Q -- to yourself.
Have you done that, sir?

A Not quite.

Q Okay. Please let me know when you have.

A Okay.

Q I want to focus in particular on the second sentence of Roman numeral number II where you state, "Dr. Harris's claim of a greatly increased quit rate is contradicted by Dr. Cummings's 1995 and 1997 analyses, and by my analyses in section I." Did I read that correctly?

A Yes.

Q What I would like to ask you, Dr. Wecker, is in what way is Dr. Harris's claim of a greatly increased quit rate contradicted by Dr. Cummings' 1995 analysis?

A Dr. Cummings' 1995 analysis finds no greatly increased quit rate.

Q And that is based on your belief that an increased quit rate of 1.8 percent is not a greatly increased quit rate; correct?

MR. MINTON: Object to the form.

THE WITNESS: I wouldn't have to limit it to that, but even that by itself, I would agree is a

contradiction as described in the sentence.

BY MR. FORESTA:

Q And Dr. Cummings' conclusion that there is a 1.8 percent increase in quit rates is based on an analysis of the entire COMMIT population; correct?

A Well, it's based on the group that they followed for the four years. The population varied in different stages and aspects of their work.

MR. MINTON: Let me belatedly assert an objection to form.

BY MR. FORESTA:

Q But Dr. Cummings, in his 1995 analysis, did not do a particularized analysis of male workers or male participants, did he?

A That's right. I did that.

Q And he didn't do a particularized analysis of blue-collar workers in the '95 analysis, did he?

A Right.

Q The analysis that you did is you applied Dr. Harris's quit rate model to the data for men from COMMIT; correct?

A That's -- we've changed subjects, but yes, I did that too.

Q And you did that, too, in addition to what?

A Well, you pointed to a sentence that you wanted to talk about, but now you're talking about another sentence. It has nothing to do with the sentence we were -- that you were asking me about.

Q Well, let me just ask you --

A I don't mind. It was just an abrupt transition. I can follow you.

Q You did an analysis, Dr. Wecker -- you conducted an analysis where you applied Dr. Harris's quit rate model to the data for men from the COMMIT rate; correct?

A That's true.

Q What data for the men did you use?

A The men who were a part of the four-year follow-up cohort.

Q You did not do an analysis where you applied Dr. Harris's quit rate model to the data for blue-collar males, did you, Dr. Wecker?

A Well, let me look. Just a minute. The answer is yes, in the following sense: That the analysis that I cite in the footnote 14, if you were to go look at it, you will see that one aspect of it is that I did include occupation variables, one of which is a blue-color variable.

Q Let me just ask this question, Dr. Wecker: Did you apply Dr. Harris's quit rate model to the data for blue-collar men from the COMMIT study?

A Yes --

MR. UGARTE: Objection.

THE WITNESS: -- I did in the sense that I just described.

BY MR. FORESTA:

Q Yes, you did?

MR. UGARTE: Object to the form.

MR. BURTON: Object to the form.

MR. MINTON: Boy, I feel real peer pressure there.

THE WITNESS: Go ahead.

BY MR. FORESTA:

Q What were the results of that analysis?

A Just a minute. It shows no significant quit rates and no significant effects of blue collar.

Q No significant quit rate --

I'm sorry, can you read the answer back, please.

(Record read.)

BY MR. FORESTA:

Q What was the quit rate that you found when you

applied Dr. Harris's quit rate model to the data for blue-collar men from the COMMIT study?

A The quit rate part is 1 -- is an odds ratio of 1.018. Not statistically significant.

Q Where do you find that -- or where would I find that? -- better.

A Tab 65.

Q 65?

A hqr3s_commit.log.

Q Can you just say that again, a little slower, please.

A Sure.

Q hqr?

A hqr3s_commit.log.

Q All right. Thank you.

The last sentence of that paragraph, Dr. Wecker, says, "I found that Dr. Harris's model estimates a statistically insignificant quit rate of only 1.04 times higher for the group educated about smoking.

A Yes.

Q You did not do an analysis of the effect on a group educated about smoking tobacco synergy, did you?

MR. UGARTE: I'm sorry, could you read that

back, please.

(Record read.)

THE WITNESS: Well, no, this is the COMMIT intervention group.

BY MR. FORESTA:

Q Right. And the COMMIT intervention group was not warned about smoking tobacco synergy?

MR. MINTON: Object to the form of the question.

MR. UGARTE: Object to the form.

THE WITNESS: I'm not sure what the full spectrum was of their contacts on that subject.

BY MR. FORESTA:

Q Okay. As you sit there, though, Dr. Wecker, can you tell me that the participants in the COMMIT intervention study were warned about asbestos tobacco synergy?

A No, I'm not sure. They had a multitude of different aspects to the intervention, but I can't tell you what they all are, and whether that was one of the things that was included or not.

Q Dr. Harris's intervention model assumes a different type of intervention than you had in the COMMIT study; isn't that correct?

MR. UGARTE: Objection. Scope.

THE WITNESS: No, no, there's nothing about the model that does anything other than compare two groups.

BY MR. FORESTA:

Q Nothing about what model? The COMMIT model?

A No, the model that is the Harris model that leads to this 1.04 number in the sentence that you're inquiring about. There's nothing to that about the assumption you mentioned. It's just a comparison of two groups.

Q Okay. But in your comparison of the two groups, did you assume that the intervention was the same in the COMMIT study and in the analysis that Dr. Harris undertook?

A No. You don't make any assumption of that kind one way or another. It's just a -- it's just an off-the-mark understanding of what you do. You just compare two groups.

Q Without taking into account any differences that might exist in the type of intervention in the COMMIT study versus the Dr. Harris model; correct?

A Right. There's nothing in the model that would ask you to make those kind of distinctions. The models that leads to this 1.04 number is -- think of it like

a -- scales, you have -- like the scales of justice, you put something on one side and you put something on the other. You don't have to tell the scale that it's an apple or a pear, it's just a comparison of the two things.

Q But in doing the comparison of two different groups, you want to have as many of the characteristics as possible to be similar; correct?

MR. MINTON: Object to the form.

MR. UGARTE: Object to the form. Vague and ambiguous.

THE WITNESS: I'll go with the vague and ambiguous.

MR. UGARTE: You can answer, Doctor, if you understand.

THE WITNESS: No. What I meant to say was I'm on the side of the objection here, so you'll have to clear that up for me.

BY MR. FORESTA:

Q Did you answer the question? And if you did, I apologize for asking it again. But to your knowledge, is the intervention that Dr. Harris considers in his model the same or similar to the intervention that was undertaken in the COMMIT study?

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MR. MINTON: Object to the form. Asked and answered.

THE WITNESS: As far as the model is concerned, it's -- there is no consideration. It's like I was telling you about a scale where you put something on one side and something on the other, it's a comparison of two groups, and the model doesn't know if you're putting on lead weights or apples or bananas. There's just no call for an assumption like that. This model simply compares the difference between two groups.

BY MR. FORESTA:

Q The COMMIT study did not involve direct intervention in the members who were in the intervention communities; isn't that correct?

MR. MINTON: Object to the form of the question.

MR. UGARTE: Object to the form. Vague and ambiguous.

BY MR. FORESTA:

Q Direct intervention between the study investigators and the participants in the study.

MR. MINTON: Same objection.

THE WITNESS: Well, there were contacts from the study -- the people who conducted the study and the

participants, but I take it that you mean the various intervention programs of education and all the other things they did. Those were not one on one, but they were a variety of schemes that were thought to impact all the people in the community.

MR. FORESTA: I've literally run out of questions.

THE WITNESS: Well --

MR. FORESTA: I just want to --

THE WITNESS: Thank you.

MR. FORESTA: -- repeat -- I just want to repeat for the record my request that we get a copy of the CDC report that Dr. Wecker referred to before as part of his most recent analysis.

THE WITNESS: I've already asked my office to do that, and they told me that we were past our Federal Express date here, and it's about 190 pages long, and you and I agreed that we could send it out to you tomorrow, and that's what we're going to do.

Can we clear up what the court reporter has to go copy?

MR. MINTON: Do you want --

MR. BURTON: I think she's copying folder 5, which is the folder you have in front of you.

THE WITNESS: What's 5?

MR. FORESTA: Binder.

MR. BURTON: The binder. You're going to see send us the CDC report.

MR. MINTON: You want to read and sign or waive?

THE WITNESS: Read and sign.

She's got 5. Is that enough?

MR. MINTON: We're going to read and sign.

MR. BURTON: What did we decide to do with Exhibit 4, Dr. Wecker, which is your copy of the monograph? To make a copy of it for the reporter?

THE WITNESS: Oh, that's up to you guys. I'm open to your suggestions. It's a big thick thing, and she's not anxious to copy it, but --

MR. MINTON: There is a note. He did find some notes on one table. Maybe you just want to copy that one table or whatever, or you can have Mike look at it or whatever, but there are notes -- there is a note at least on one page.

THE WITNESS: Page 31. Well, how about if we just send you page 31. I just circled the numbers on the right-hand side of the table, those are -- and we talked about those.

MR. FORESTA: Well, I certainly want any of the pages that have notes on it, but mechanically, what I'm going to have to do, then, is make a copy of the balance of the monograph and then have the exhibit sticker put on that. I don't know if anyone's got a problem with that.

MR. BURTON: Or why don't you have it copied and send it up here when you send the CDC report.

MR. UGARTE: You know, here's my only problem.

THE WITNESS: Yeah, I can do that. I can copy it -- if you don't mind, I can copy it at my office tomorrow and send it along with the CDC report, and it will have any notations, including the one -- I think it's the only one -- on page 31.

MR. FORESTA: Does it have the exhibit sticker number 4 on it?

THE WITNESS: Yes, it does.

MR. FORESTA: All right.

MR. UGARTE: Dr. Wecker, are you familiar enough with the notes on that to say that they're your notes, or do you know if they're all your notes? I mean, that's my only concern, is the --

THE WITNESS: Well, there was some handwriting on them, but I had no idea -- it's the way it came to

me, so I think it's fine. It says, "HVC737 1995," I have no idea what that means.

MR. MINTON: It's a library --

THE WITNESS: It's a library kind of thing. I'll make a copy and send it along with the CDC thing.

MR. MINTON: He's going to send it to you, Rich, along with the other thing, and you can get it delivered to the plaintiffs.

MR. FORESTA: Thank you, Dr. Wecker.

THE WITNESS: Okay, bye.

THE VIDEOGRAPHER: Thank you. This concludes today's deposition of Dr. Wecker. The number of videotapes used is three. The time is 8:45, and we are going off the record.

//

//

I, WILLIAM E. WECKER, Ph.D., do hereby declare under penalty of perjury that I have read the foregoing transcript; that I have made such corrections as noted herein, in ink, initialed by me, or attached hereto; that my testimony as contained herein, as corrected, is true and correct.

EXECUTED this______ day of______________,

2000, at __________________________, ___________________.
(City) (State)

____
WILLIAM E. WECKER, Ph.D.

STATE OF CALIFORNIA)
: ss
COUNTY OF CONTRA COSTA)

I, the undersigned, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a verbatim record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

I further certify that I am neither financially interested in the action nor a relative or employee of any attorney of any of the parties.

IN WITNESS WHEREOF, I have this date subscribed my name.

Dated: DECEMBER 15, 2000

Gina Glantz

GINA GLANTZ
CSR No. 9795

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Falise, et al. v. The American Tobacco Company, et al.

Report of William E. Wecker, Ph.D., In Response To Dr. Cummings's September 22, 2000 Supplemental Report

December 4, 2000

My name is William E. Wecker. I am a statistician and applied mathematician. I received the Bachelor of Science degree (Basic Sciences) from the United States Air Force Academy and both the Master of Science degree (Operations Research) and Doctor of Philosophy degree (Statistics and Management Science) from the University of Michigan. I have served on the faculties of the University of Chicago, the University of California, Davis, and Stanford University where I taught statistics and applied mathematics at the graduate level and did research in statistical theory, statistical methods, and applied mathematics for seventeen years. I am currently President of William E. Wecker Associates, Inc., an applied mathematics consulting firm located in Novato, California. I am a member of the American Statistical Association, the Institute of Mathematical Statistics, and the Society for Risk Analysis. I have served as associate editor of the Journal of the American Statistical Association for four years and of the Journal of Business and Economic Statistics for seventeen years.

Counsel for Defendants has asked me to review and comment on the materials, analyses and calculations referenced in Dr. Cummings's September 22, 2000 report that concern his estimate of the effect of education about smoking on smoking quit rates. I have two principal conclusions: First, Dr. Cummings's estimate of the effect of education about smoking on the smoking quit rate based on his analysis of the COMMIT data is statistically flawed and overstated. Second, Dr. Cummings's estimate of the effect of education about smoking on smoking quit rates contradicts Dr. Harris's estimated effect of information about smoking on smoking quit rates and shows that Dr. Harris's smoking "attributable" claims estimate is overstated.

Wecker
EXHIBIT NO. 1
12-13-00
GINA GLANTZ

52614 0735

I. DR. CUMMINGS'S ESTIMATED EFFECT OF EDUCATION ABOUT SMOKING ON THE SMOKING QUIT RATE IS STATISTICALLY FLAWED AND OVERSTATED

Dr. Cummings bases his claim that the "COMMIT education program was successful in significantly boosting quit rates by 1.8% overall"[1] on a 1995 paper that he coauthored regarding COMMIT. But Dr. Cummings's 1995 published analysis was refined in his 1997 published analysis by considering other factors that influence the smoking quit rate, such as gender, age, income and alcohol use. The result of Dr. Cummings's more refined analysis of the COMMIT data shows that the COMMIT intervention program had a statistically insignificant effect on the smoking quit rate.[2]

In addition, the population studied in Dr. Cummings's 1995 and 1997 published analyses is the general population of men and women from the intervention communities. The population at issue in this case is predominately male and blue collar.[3] I analyzed the male members of the COMMIT population using the same methods that Dr. Cummings used in his 1995 paper. I found no statistically significant effect of the COMMIT intervention on the male members of the COMMIT population.[4] I also analyzed the male members of the COMMIT population using the same methods that Dr. Cummings used in his 1997 paper. Again, I found no statistically significant effect of the COMMIT intervention on the male members of the COMMIT population.[5]

I also analyzed the blue collar male members of the COMMIT population using the same methods that Dr. Cummings used in his 1995 paper. I found no statistically significant effect of the COMMIT intervention on the blue collar male members of the COMMIT

[1] K. Michael Cummings, Supplemental Expert Report, *Falise, et al. v. The American Tobacco Company, et al.*, September 22, 2000 cites The COMMIT Research Group, Community Intervention Trial for Smoking Cessation (COMMIT): I. Cohort Results from a Four-Year Community Intervention, *American Journal of Public Health*, Feb 1995.

[2] N. Hymowitz, K. Michael Cummings, et al., Predictors of smoking cessation in a cohort of adult smokers followed for five years, Tobacco Control, 1997:6 (suppl 2), p. S60 (table 2) and my computer file tab70/cascade.sas.

[3] K. Michael Cummings, Supplemental Expert Report, *Falise, et al. v. The American Tobacco Company, et al.*, September 22, 2000, p. 2.

[4] See my computer file tab72/diff18_male.sas.

[5] See my computer file tab70/cascade.sas.

population.[6] I also analyzed the blue collar male members of the COMMIT population using the same methods that Dr. Cummings used in his 1997 paper. Again I found no statistically significant effect of the COMMIT intervention on the blue collar male members of the COMMIT population.[7]

Furthermore, the 1.8 percent increase in quit rates, cited in Dr. Cummings's supplemental report, does not consider or control for the quit rate differences between the intervention and control communities that existed prior to the COMMIT intervention.[8] I found that the intervention communities had higher smoking quit rates than the control communities even before the COMMIT intervention. When I refined the 1995 analysis by controlling for the quit rate differences between the intervention and control communities prior to the intervention, I found that there was no significant intervention effect.[9]

Finally, the COMMIT intervention included more than just education about smoking. It also included efforts to increase taxes, constraints on advertising and promotion of tobacco products, policies related to the sale and distribution of cigarettes, and restrictions on smoking in public places.[10] Dr. Cummings's analysis of the COMMIT intervention does not and cannot distinguish any effect of education from the effects of efforts to increase taxes, constraints on advertising and promotion of tobacco products, policies related to the sale and distribution of cigarettes, or restrictions on smoking in public places. Therefore, Dr. Cummings's claim that "COMMIT education program was successful in significantly boosting quit rates by 1.8%

[6] See my computer file tab72/diff18_maBC.sas.
[7] See my computer file tab70/cascade.sas. Notably, when I added indicators for occupation to Dr. Cummings's analysis, I found that quit rates for blue collar workers do not differ significantly from those of workers in other occupations.
[8] See my computer file tab71/logisiticRegression.sas. Community Based Interventions for Smokers. The COMMIT Field Experience. NIH National Cancer Institute. Monograph 6 1995, Ch. 3, Table 3.
[9] See my computer files tab72/diff18_88.sas. Community Based Interventions for Smokers. The COMMIT Field Experience. NIH National Cancer Institute. Monograph 6 1995, Ch. 3, Table 3.
[10] Community Based Interventions for Smokers. The COMMIT Field Experience. NIH National Cancer Institute. Monograph 6 1995, pp. 41, 78, 80, 84.

overall"[11] is flawed because his analysis, at best, is an analysis of the COMMIT intervention program of which education was but a part.

II. DR. CUMMINGS'S ESTIMATE DEMONSTRATES THAT DR. HARRIS'S ESTIMATE OF SMOKING "ATTRIBUTABLE" CLAIMS IS OVERSTATED

As a basis for his conduct "attributable" claims estimate, Dr. Harris claims that if the Defendants had given information about smoking to the Manville Trust claimants then their quit rate would have been greatly increased.[12] Dr. Harris's claim of a greatly increased quit rate is contradicted by Dr. Cummings's 1995 and 1997 analyses and by my analyses in section I. Moreover, I applied Dr. Harris's quit rate model[13] to the data for men from COMMIT. I found that Dr. Harris's model estimates a statistically insignificant quit rate of only 1.04 times higher for the group "educated about smoking."[14]

Documentation of my analyses and charts is included in the electronic media provided with this report.

Wm Wecker

William E. Wecker

[11] K. Michael Cummings, Supplemental Expert Report, *Falise, et al. v. The American Tobacco Company, et al.*, September 22, 2000 cites The COMMIT Research Group, Community Intervention Trial for Smoking Cessation (COMMIT): I. Cohort Results from a Four-Year Community Intervention, *American Journal of Public Health*, Feb 1995.
[12] JE Harris, Report 6, Expert Report in Falise, et al. v. American Tobacco Co., et al., June 14, 2000, p. 18.
[13] JE Harris, Report 6, Expert Report in Falise, et al. v. American Tobacco Co., et al., June 14, 2000, p. 18.
[14] See my computer file /tab65/nqr3s_commit.do and my computer files in /tab66-69.

Attachment A

Additional Materials Considered

1. K. Michael Cummings Expert Report, Falise, et al. v. The American Tobacco Company, et al., September 22, 2000.
2. Data files collected from the COMMIT smoking cessation study.

52614 0739

Community Intervention Trial for Smoking Cessation (COMMIT): I. Cohort Results from a Four-Year Community Intervention

*The COMMIT Research Group**

ABSTRACT

Obj[illegible]he primary hypothesis of COMMIT (Community Intervention T[illegible] for Smoking Cessation) was that [illegible]munity-level, multichannel, [illegible] intervention would increase quit rates among cigarette smokers, [illegible]y smokers (≥25 cigarettes per da[illegible] of priority.

Meth[illegible] community within each of 1[illegible] m[illegible]ed community pairs (10 in the [illegible] States, 1 in Canada) was randomly assigned to intervention. Endpoint cohorts totaling 10 019 heavy smok[illegible] 10 328 light-to-moderate smokers were fo[illegible] by telephone.

Res[illegible] mean heavy smoker quit rate (i.e., the fracti[illegible]hort members [illegible]ad achieved and maintained [illegible]ion at the end of the trial) was [illegible]180 for intervention communitie[illegible]s 0.187 for comparison com[illegible]ities, a nonsignificant differe[illegible]e-sided P = .68 by permutation [illegible]; 90% test-based confidence i[illegible] (CI) for the difference = −0.[illegible]019). For light-to-moderate [illegible]rs, corresponding quit rates w[illegible]06 and 0.275; this difference wa[illegible]gnificant (P = .004; 90% CI = 0[illegible] 0.047). Smokers in intervention [illegible]unities had greater perceived e[illegible]osure to smoking control activitie[illegible] correlated with outcome on[illegible] light-to-moderate smokers.

Conclusions. The impact of this community-based intervention on light-to-moderate smokers, although modest, has public health importance. This intervention did not increase quit rates of heavy smokers; reaching them may require new clinical programs and policy changes. (*Am J Public Health.* 1995;85:183–192)

Introduction

As a primary objective in the goal to reduce cancer mortality rates in the United States, the National Cancer Institute (NCI) has specified a rapid reduction in the prevalence of smoking by adults. Although this prevalence steadily declined in the 1980s, more than 50 million Americans continued to smoke.[1] This fact showed the need for effective methods to help smokers quit. Since the early 1980s, the NCI has supported an extensive program of smoking cessation studies,[2] in which various interventions are separately developed and evaluated. These studies, which focus on specific agents of change (e.g., counseling by physicians, clinical interventions, work-site programs), have identified the most efficacious interventions among individuals and groups who volunteer to participate.

In 1986, the NCI funded the Community Intervention Trial for Smoking Cessation (COMMIT), a randomized controlled trial at the community level based on proactive efforts to reach smokers through existing social institutions.[3] The philosophy was to bring diverse organizations, institutions, and individuals together to conduct smoking cessation activities. It was assumed that a comprehensive communitywide strategy would make it difficult for residents to avoid exposure to messages about the importance of nonsmoking and would alert smokers to the many opportunities for cessation. Building on the results of previous studies,[2] COMMIT combined a variety of interventions intended to help smokers achieve and maintain cessation. The assumption was that the combination would be more effective than the sum of the individual component effects.

Community-based health promotion programs that include smoking cessation efforts have already been conducted, especially those focused on heart disease prevention[4-7] as well as other health goals.[8] In these earlier projects, however, efforts to change smoking behaviors were embedded in interventions designed to affect multiple risk factors simultaneously. Furthermore, only a few communities were used, and these were nonrandomly assigned to conditions, making it difficult to separate the effects of intervention activities from the inherent differences between communities.

In COMMIT, smoking was the only behavior targeted for intervention. Moreover, among community-based smoking-control studies, COMMIT was unique in that it randomly assigned communities to intervention, and it included a sufficient number of community pairs to provide good statistical power for detecting intervention effects on smoking cessation rates using the community as the unit of analysis.[9] The trial involved 11 matched pairs of communities: 10 in the United States and 1 in Canada (see Appendix B). Within each pair, one community was randomly assigned to intervention and the other served as comparison.

The design of COMMIT focused on the outcome for "heavy" cigarette smokers (those who smoked 25 or more cigarettes per day), whose smoking prevalence rates have been slower to decline

*See Appendix B for a complete listing of the members of the group.

Sylvan B. Green, MD, assumes full responsibility for the content and integrity of the paper.

Requests for reprints should be sent to William R. Lynn, National Cancer Institute, Executive Plaza North, Suite 241, Bethesda, MD 20892.

This paper was accepted November 9, 1994.

Editor's Note. See related editorials by Susser (p. 156) and Fisher (p. 159) in this issue.

than those of "light-to-moderate" smokers. Because heavy smokers represent one third of all cigarette smokers but account for nearly one half of all lung and other smoking-related cancers,[10] they are a group especially in need of targeting. Thus, reaching this population via a multichannel communitywide strategy was considered the most important aspect of COMMIT, although it was assumed that if this group could be reached, light-to-moderate smokers would also be affected.

Thus, the primary hypothesis tested in COMMIT was that a defined intervention, delivered through multiple community sectors and organizations over a 4-year period and using limited external resources, would result in higher quit rates among heavy cigarette smokers in the intervention communities than in the comparison communities. The outcome measure for testing this hypothesis was specified as the quit rate among a cohort of heavy smokers to be followed in each community; "quit rate" was defined as the fraction of cohort members who had achieved and maintained cessation for at least 6 months at the end of the trial. The expected quit rate for heavy smokers in the comparison communities was 0.15, and trial planners postulated a 0.25 quit rate in the intervention communities after the 4-year intervention. Separate analysis of quit rates in light-to-moderate smokers was also planned; the outcome measures reported here are the quit rates in both smoker cohorts. Cross-sectional changes in prevalence were measured as another test of the intervention and are reported separately.[1]

Methods and Materials

Because the COMMIT intervention was community based, the community was chosen as the unit of randomization. The two communities within each of the 11 selected pairs were matched for geographic location (state or province), size, and general sociodemographic factors.[12] According to data from the 1990 Census (1991 in Canada), community populations varied from 49 421 to 251 208 residents, with comparable means for the pooled intervention and comparison communities. Further details on the communities and the matching are presented elsewhere (although this earlier report used 1980/1981 Census data).[12]

From January to May 1988, a telephone survey was conducted to estimate baseline prevalence and identify cohorts of heavy and light-to-moderate smokers within each community. Following that, the communities within each matched pair were randomized, one to the intervention and the other to the comparison condition.[9] Intervention started after randomization, beginning with mobilization of the communities. Specific intervention activities took place from January 1989 through December 1992, during which time cohort members were contacted annually by telephone. The final such contact occurred between January and May 1993, followed by the final prevalence survey from August 1993 to January 1994.

Trial Organization and Intervention

COMMIT was a partnership among 11 participating research institutions, the corresponding local communities, a coordinating center responsible for data management, NCI program staff, and NCI biostatisticians. A considerable amount of community mobilization was required to set the stage for protocol implementation.[13] Each community formed a community board that consisted of key community representatives, was charged with representing the COMMIT project to the community, and had overall responsibility for planning implementation of COMMIT interventions.

Intervention focused on four primary channels: public education through the media and communitywide events; health care providers; work-sites and other organizations; and cessation resources. Within these channels, the protocol specified 58 mandated activities, defined so they could be carried out largely by community volunteers or local staff or agencies with limited external resources. These activities were implemented through four community task forces (representing the four channels), each having a set of general goals and a set of measurable process objectives that guided the activities. Although COMMIT aimed at creating a demand for cessation services, funds were not provided to support such services directly. Appendix A summarizes the major mandated activities by task force; these are described in more detail elsewhere.[14-17]

A program records system, monitored by the coordinating center, was developed to check implementation of the protocol.[18] Process objectives for each protocol element established the minimum level of activity to be conducted annually in each community. For the four intervention channels, the mean level of attainment across the 11 sites varied from 90% to 93%. Nearly all mandated activities were implemented in a timely fashion.[19] Optional activities (such as training for pharmacists, mass media cessation campaigns, etc.) were also permitted by the protocol, and one or more optional activities were implemented in each intervention site. Because of the inherent variability of community needs and capabilities, COMMIT sought to strike a balance between standardization of activities across sites and the need for community tailoring.[19]

Each intervention community recruited a field director, who had primary responsibility for ensuring that the intervention protocol was implemented and who was accountable to both the community board and the research institution. The field director hired and supervised an office manager and, on average, two full-time intervention staff; all worked with the task forces to implement mandated activities. Including salaries, COMMIT provided each intervention community with an average of $220 000 per year for 4 years to support the intervention.

Identification of Endpoint and Evaluation Cohorts

The baseline survey was conducted centrally using a modified random-digit-dialing technique with community-specific geographic screening to identify households within the targeted areas.[11] The mean response rate (across communities) for the household-rostering portion of the survey was 83.7%, with approximately 5400 households contacted in each of the 22 communities; response rates have been recalculated since an earlier publication.[12] Of the smokers identified as such from the household rostering, 91.5% completed an extended interview. Based on this interview, a smoker was defined as someone who had smoked at least 100 cigarettes in his or her lifetime and who smoked currently at the time of interview; a heavy smoker was defined as one who reported smoking 25 or more cigarettes per day (either per weekday or per weekend day), while a light-to-moderate smoker reported smoking fewer than this number.

Approximately 550 heavy smokers and 550 light-to-moderate smokers between 25 and 64 years of age were identified in each community to be followed prospectively. An 80% sample was randomly drawn from each of these groups to form "endpoint cohorts," in whom smoking quit rates were to be determined for the principal COMMIT

outcome measures. The remaining 20% of the smoker groups served as "evaluation cohorts"[20] to assess three issues related to trial goals: (1) the impact of COMMIT on intervention program awareness, receptivity, and participation; (2) recognition of smoking as a public health problem; and (3) change in the social acceptability of smoking. Results from the evaluation cohorts will be presented in a later paper.

Endpoint cohort members were not explicitly notified of their status as cohort members. However, respondents were informed that they would be contacted annually. In 1993, at the final annual contact to assess smoking status, the endpoint cohorts were also asked a set of questions to assess intervention program awareness and participation. These questions were asked after smoking status was ascertained, so there was no possibility that asking such questions could affect estimates of quit rates. These questions also estimated awareness of and participation in tobacco control activities for comparison communities.

Steps were taken to contact cohort members even if they moved out of the community. To minimize attrition, various methods were used to obtain new telephone numbers for members who could not be reached at their last known number; these methods began with Directory Assistance, followed by telephone contact with any individuals whose names the cohort members may have provided, followed by searches by credit bureaus. The only information accessed in these inquiries was name, age, sex, address, and telephone number. At the final annual contact, cohort members who declined to be interviewed were asked if they would respond to an abbreviated set of questions about their current smoking status. Members not contacted by telephone were mailed these questions. These methods yielded data on current smoking status from an additional 6.7% of the combined endpoint cohorts.

To ensure that the cohorts remained as representative as possible of their communities, minimal telephone contact occurred during the trial and no intervention activities were directed specifically at individual cohort members. Trial investigators and local program staff were not informed of which smokers were selected for the COMMIT cohorts and were blinded to smoking status data during the trial. Population-based surveys were conducted centrally by independent contractors. All surveys were identified as being sponsored by the US Public Health Service or, in Canada, by the University of Waterloo and McMaster University, but none was linked to local COMMIT activities. Details have been presented elsewhere.[12]

Statistical Analysis

Separate analyses were performed using data from the 10 019 individuals in the heavy smoker endpoint cohort and the 10 328 members of the light-to-moderate smoker endpoint cohort, as defined at baseline. For the primary outcome measure of COMMIT, a "quitter" was defined as a cohort member who, at the final annual contact in 1993, reported not smoking any cigarettes for the preceding 6 months or longer. The quit rate (i.e., the fraction of cohort members who met this definition of quitting) was determined for each of the 22 communities, and the differences in quit rates between the intervention and comparison community of each pair were calculated.

Significance testing was done using a permutation test[21] accounting for the fact that communities (rather than individuals) were randomized and that this randomization was performed within community pairs. To perform the permutation test for a specific outcome variable, the mean of the 11 pairwise differences between intervention and comparison communities was calculated for each of the 2^{11} (= 2048) equally likely ways that the intervention assignments could have occurred during randomization. The rank of the observed mean among all 2048 possible means provided the significance level. As specified during the design phase of COMMIT,[9,12] one-sided permutation tests were used to analyze intervention effects. Permutation tests were also used to determine test-based confidence intervals (CIs) for the differences between intervention and comparison conditions; 90% confidence intervals are reported, corresponding to one-sided tests at the $P = .05$ level. Two-sided permutation tests were used to analyze comparability of follow-up (response rates) between intervention and comparison communities. When intervention effects were determined separately within subsets of cohort members defined by demographic factors, two-sided permutation tests were used to investigate the statistical interactions (i.e., the extent to which observed differences in intervention effects between subsets were consistent with chance).

Quit rates of intervention and comparison communities were compared in two ways. The first approach used the observed quit rates—namely, the fraction of those quitting among all individuals who provided information on their smoking status at the 1993 contact. This analysis omits those with missing data in 1993, which is equivalent, for point estimation, to inputing the quit rates of those individuals with known outcome to those with missing data. The assumption underlying such analysis is that the unknown outcomes are missing completely at random (MCAR).[22]

The second approach categorized individuals separately within each community into strata based on factors related to the final smoking outcome. Within each stratum, the quit rate of those not missing at final follow-up was used as the imputed probability of quitting for those with missing data. The quit rate for each community was then estimated by averaging over all cohort members in that community, with each known quitter assigned the value 1, each known continued smoker assigned the value 0, and each missing person assigned the quit probability that had been estimated for that individual's stratum. Such analysis is based on the assumption that the unknown outcomes are missing at random (MAR),[22] conditional on stratum membership. This assumption is less restrictive than missingness completely at random, so this procedure may be preferable to the MCAR analysis.

For this imputation, 16 strata were defined within each community; for each of these strata, data on those known in 1993 were used to impute quit rates for those missing in 1993. Initial stratification was done by reported smoking status on intermediate follow-up contacts in 1991 and 1992 (with each respondent classified as smoker, quitter, or missing), producing nine possible strata. Eight of these strata, representing individuals with one or more nonmissing observations in 1991 and 1992, were used without further subdivision. Those with missing information in both 1991 and 1992 were further classified according to 1990 status as smoker or quitter, thus producing two additional strata. For those with missing information in all three intermediate years and for those in a stratum with no individuals known in 1993, imputation was based on the two baseline variables selected as the most important variables in a stepdown logistic regression procedure[23] for the heavy smoker cohort using data from all 22 communities; these variables were time to the first cigarette of the morning (less

TABLE 1— Numbers (n) of Individuals in the Cohorts[a] and Fraction (f) of Those Who Met the Definition of Quitting, with Imputation for Those Unknown in 1993 (MAR Analysis)[b]

	Heavy Smoker Cohort (n = 10 019)					Light-to-Moderate Smoker Cohort (n = 10 328)				
	Intervention (n = 4976)		Comparison (n = 5043)			Intervention (n = 5177)		Comparison (n = 5151)		
Pair	n	f	n	f	Difference	n	f	n	f	Difference
1	442	0.139	435	0.205	−0.066	504	0.279	519	0.286	−0.007
2	53[illegible]	0.163	489	0.202	−0.039	475	0.304	453	0.267	0.037
3	[illegible]	0.164	464	0.163	0.002	443	0.315	448	0.252	0.064
4	[illegible]28	0.204	497	0.249	−0.045	463	0.345	475	0.299	0.046
5	440	0.183	458	0.160	0.022	473	0.342	472	0.332	0.010
6	[illegible]	0.164	454	0.186	−0.022	470	0.306	482	0.299	0.007
7	[illegible]	0.262	451	0.230	0.032	463	0.332	475	0.303	0.028
8	455	0.193	434	0.169	0.024	473	0.334	464	0.254	0.080
9	[illegible]	0.215	462	0.127	0.088	492	0.291	456	0.263	0.027
10	[illegible]26	0.136	451	0.172	[illegible]	479	0.244	467	0.256	−0.012
11	[illegible]	0.155	446	0.189	[illegible]	442	0.273	440	0.218	0.055
Community m[illegible]		0.180		0.187	−0.00[illegible]*		0.306		0.275	0.030**

[a]In th[illegible] represents the sum of [illegible] observed outcome and those with imputed out[illegible]mates of quit rates based on such n have greater uncertainty than would occur with the[illegible] had been observed.
[b]MAR[illegible] at random.
*P (one-sided) = .68; 90% confidence int[illegible].031, 0.019.
**P (one-sided) = .004; 90% confidence interval = [illegible].014, 0.047.

than 10 [illegible], 10 to 30 [illegible]tes, m[illegible] than 30 minutes) and age (25 to 39 years, 40 to 64 years). To attain more st[illegible] estimat[illegible]e six additional st[illegible] formed by [illegible]ss-classification of th[illegible] variables, quit rates for each stratum were obtained [illegible] all individuals in [illegible] community with known information in 1993, incl[illegible]ose with known intermediate smok[illegible]tus.

In se[illegible] analyses, logistic regres[illegible] sion was [illegible] to adjust for pos[illegible] imbala[illegible]dividual-level covariates. Baseline c[illegible]tes were chosen a p[illegible] because th[illegible] were considered to be predictive for quitting cigarette smoking. The progn[illegible] value of each covariate was first [illegible] one at a time, with significance [illegible]ing based on a logistic model wit[illegible]le term for the covariate plus a sep[illegible]ercept for each of the 22 communities. The covariates were then included together in a logistic model, along with a separate intercept for each community pair; stepdown regression was used to remove covariates not significantly prognostic (at the $P = .05$ level) when adjusted for other variables in the model. This stepwise procedure was done for the heavy smoker cohort; the selected variables were also used for the light-to-moderate smoker cohort although coefficients were obtained separately for each cohort. Because these models included no intervention indicator, they could be used to predict outcome under the null hypothesis of no intervention effect. By averaging predictions over individuals in each community, it was possible to determine residuals between observed and predicted quit rates. Differences in these residuals between the intervention and comparison communities of each pair were then calculated as a measure of intervention effect adjusted for baseline covariates, and a permutation test was performed on these paired differences.[9]

Using the data on perceived receipt of smoking control activities (awareness and participation), we calculated five "receipt indices," each associated with a major component of the COMMIT intervention, and three additional indices, which represent more general questions about tobacco control activities. An overall assessment was obtained by summing these eight separate indices. For this summary measure, each component index was "standardized" by subtracting its mean (based on individuals in the comparison communities) and dividing the remainder by its within-community standard deviation (obtained from analyses of variance). Standardization was done so that the separate component indices would have equivalent weights in the summary measure.

For analyses of number of cigarettes smoked, each individual was asked to provide estimates of daily consumption separately for weekdays and weekends, and these were combined into a daily mean. At baseline, the median daily cigarette consumption was 30 for heavy smokers and 15 for light-to-moderate smokers.

Results

As has been noted, COMMIT was a randomized trial with a sample size of 11 matched pairs of communities. In tables of results, these pairs are listed in arbitrary order and labeled 1 through 11; the individual communities are not identified. The order is the same across tables but does not correspond to the order in which the communities are listed in Appendix B.

Data Response Rates for Smoking Status Information

Data response rates (percentages of cohort members who provided smoking status at the final contact in 1993) were calculated separately by cohort. For the heavy smoker cohort, the means of the 11 community-level rates for the intervention communities, 67.9%, and the comparison communities, 67.8%, were virtually identical (two-sided $P = .88$ by permutation test). The corresponding rates for the light-to-moderate smoker cohort were 64.2% and 65.0%, also not significantly different ($P = .42$). There was much variability across communities but relatively little within pairs.

Most of the cohort members who were classified as nonresponders were those who could not be located, 28.6% of members (mean across communities); an additional 2.4% were reported deceased. For the remaining 2.8% (2.9% across intervention communities, 2.6% across comparison communities), the respondents refused to be reinterviewed or there was a problem obtaining the interview. Analysis of the heavy smoker cohort showed that attrition tended to be higher for younger, single, less educated respondents.

Cohort Quit Rates

Quit rates with imputation for missing values, using the MAR analysis described under Methods, are shown in Table 1. For the heavy smoker cohort, the

mean quit rate of the 11 intervention communities was 0.180, compared with 0.187 for the 11 comparison communities (one-sided $P = .68$ by permutation test). The 90% test-based confidence interval for the difference (−0.031, 0.019) includes zero. In contrast, the corresponding quit rates for the light-to-moderate smoker cohort were 0.306 and 0.275, and the difference of 0.03 (i.e., an additional 3% of light-to-moderate smokers quitting) was statistically significant ($P = .004$; 90% CI = 0.014, 0.047).

The observed quit rates (MCAR analysis) yielded quite similar results. For the heavy smoker cohort, the mean quit rate of the 11 intervention communities was 0.1[illegible] compared with 0.190 for the 11 comparison communities ($P = .63$; 90% CI = −0.[illegible], 0.021). The corresponding quit rates for the light-to-moderate smoker cohort were 0.309 and 0.280, and the difference [illegible] statistically significant ($P = .004$; 90% CI = 0.015, 0.045).

A subsidiary MCAR analysis [illegible] performed with adjustment for individual-level ba[illegible]ariates. Ten covariates, chosen a priori, were first investigated individually for prognostic value within the heavy smoker cohort (Table [illegible]. Stepwise regression selected five of these for use in a[illegible]d analyses: age, time to first ci[illegible]esire to [illegible] marital status, and presence of [illegible]moker in the household. Permutation tests on the residuals between observed and predicted quit rates, comparing intervention and comparison communities, gave results similar to the unadjusted analyses. For the heavy smoker cohort, there were 6717 individuals with known covariates and outcome; t[illegible]usted analysis was [illegible] significant ([illegible]66). For the light-to-moderate smoker cohort, there were 6516 individuals with known data; the adjusted analysis was highly significant ($P = .003$). Thus, adjustment for possible imbalances in prognostic factors did not alter the conclusions derived from unadjusted analyses.

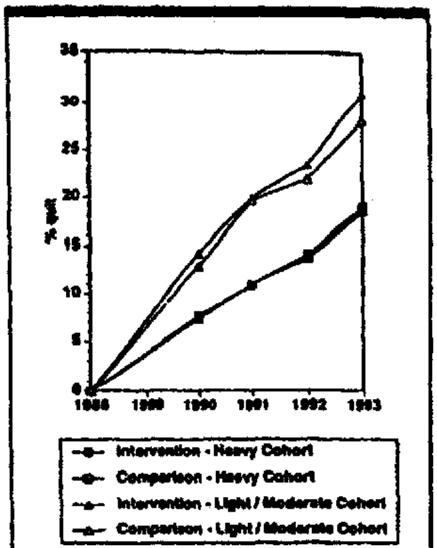
To gauge the public health impact on all smokers, [illegible] observed quit rates (MCAR) from both the heavy and light-to-moderate smoker cohorts were weighted in proportion to their prevalence at baseline in each community. The mean combined quit rate was 0.265 for intervention communities and 0.247 for comparison communities. The combined difference of 0.018 (i.e., an additional 1.8% of smokers quitting) was significant ($P = .031$; 90% CI = .002, 0.034).

TABLE 2—Observed Quit Rates in the Heavy Smoker Cohort, by Categories of Baseline Covariates

	n	Fraction Quitting	P (Two-Sided)
Age, y			
40–64	3649	0.206	<.0001
25–39	3138	0.165	
Sex			
Female	3033	0.176	.028
Male	3760	0.196	
Education			
No college	3014	0.192	.56
Some college	3787	0.183	
Age when started smoking, y			
<17	3170	0.180	.067
≥17	3640	0.193	
Cigarettes per day, no.			
≤30	4076	0.192	.17
>30	2709	0.179	
Time to first cigarette			
<10 min	3202	0.166	<.0001
10–30 min	2261	0.190	
>30 min	1335	0.234	
Desire to quit			
Not at all	1165	0.156	.0001
A little	1050	0.173	
Somewhat	2074	0.184	
A lot	2489	0.206	
Quit attempts in past year			
No or unknown	4358	0.179	.078
Yes	2455	0.201	
Marital status			
Married or live with partner	4714	0.197	.0007
Other	2077	0.165	
Another smoker in household			
No	4282	0.199	.0008
Yes	2531	0.166	

Rep. 3, p. 1
T 3, 72, P1

The design of COMMIT specified that the primary outcome measure was the fraction of cohort members who had achieved and maintained cessation at the end of the trial. For descriptive purposes only, we plotted observed quit rates in 1990, 1991, 1992, and 1993 (Figure 1) to show trends in quitting over time. The data represent the fraction of respondents at each time point who reported not smoking cigarettes for at least 6 months at that survey time. Both smoker cohorts showed a steady increase in quit rates for intervention and comparison communities. Although the number of cohort members contributing to each point varies by year, thus requiring caution in interpretation, Figure 1 suggests an emerging difference in quit rates between intervention and comparison groups for the light-to-moderate smokers over time, with no intervention effect on quit rates for the heavy smokers.



Note. Different numbers of subjects contribute at each time point. MCAR = missing completely at random.

FIGURE 1—Observed quit rates (MCAR) over time for heavy and light-to-moderate smoker cohorts.

The observed quit rates (MCAR) for the intervention and comparison communities by age, sex, and educational level are shown in Table 3 for both smoker cohorts; these demographic factors were selected a priori as being of interest. The nominal P values should be interpreted with caution because of the multiple comparisons involved. One interaction test was statistically significant, suggesting that the intervention effect did differ in the light-to-moderate smoker cohort according to educational level, with most of the beneficial effect of the intervention seen in the lesser educated subgroup. The other subgroup differences in intervention effect are consistent with chance.

Wee 3, p. 2, fn 1
$.265/.247 = 1.07$ $(1.07)^{1/4} = 1.017$ (compare H 3.3

TABLE 3—Numbers (n) of Individuals with Known Smoking Status and Community Mean Fraction (f) of Those Who Met the Definition of Quitting, within Demographic Subsets

	Heavy Smoker Cohort						Light-to-Moderate Smoker Cohort					
	Intervention		Comparison				Intervention		Comparison			
Subset	n	f	n	f	Difference	P*	n	f	n	f	Difference	P*
Age 40–64 y	1813	0.205	1836	0.208	−0.003	.56	1682	0.318	1638	0.297	0.021	.26
Age 25–39 y	1569	0.162	1569	0.171	−0.009	.72	1618	0.303	1690	0.259	0.044	.03
Interaction						.78						.65
Female	1459	0.176	1574	0.176	0.000	.50	1880	0.306	1921	0.277	0.029	.011
Male	1934	0.192	1846	0.201	−0.009	.73	1437	0.314	1415	0.284	0.031	.049
Interaction						.56						.96
No college	1458	0.193	1556	0.191	0.002	.45	1332	0.302	1443	0.248	0.055	.007
Some college	1929	0.178	1858	0.192	−0.013	.80	1975	0.309	1869	0.306	0.004	.33
Interaction						.24						.032

*P values [illegible] intervention effect within subsets [illegible] one-sided; interaction P values are two-sided.

TABLE [illegible] [illegible]rences in Receipt Indices, by Intervention Condition

	Heavy Smoker Cohort (n = 5950)				Light-to-Moderate Smoker Cohort (n = 5821)			
	Community Means				Community Means			
Index ([illegible] Minimum–Maximum Values)	Intervention (n = [illegible])	Comparison (n = 2978)	Difference	P*	Intervention (n = 2890)	Comparison (n = 2931)	Difference	P*
Cessa[illegible]urces (0–[illegible])	[illegible]	0.650	0.041	.11	0.600	0.569	0.031	.11
Health care (0–6)	[illegible]	1.735	0.126	.023	1.353	1.299	0.054	.062
Work-sites (0–7)	[illegible]	2.137	0.042	.28	2.390	2.322	0.068	.20
Medi[illegible]ducation (0–16)	7.833	7.658	0.175	.14	7.621	7.542	0.079	.29
Religious organizations (0–10)	[illegible]	2.762	−0.080	.70	2.976	2.912	0.065	.28
Programs and materials (0–10)	[illegible]	5.041	0.466	.011	5.465	5.056	0.409	.007
Events and contests (0–10)	[illegible]	2.970	0.784	.001	3.783	3.067	0.716	.001
Smoking [illegible]cceptability (0–10)	[illegible]	6.261	−0.006	.52	6.176	6.019	0.157	.18
Summary (standardized)	[illegible]	0.118	0.577	.012	0.386	−0.178	0.563	.004

Note. The [illegible] receipt indices are as[illegible]th a major component of the COMMIT intervention; the last three represent general questions about tobacco control activities.
*P values [illegible]-sided.

Number of Cigarettes Smoked

The daily number of cigarettes that an individual smoked was analyzed as an additional measure of behavioral change. Differences between baseline and final contact were calculated, with quitters having a value of zero at the final contact, and the median difference was determined for each community. For the heavy smoker cohort, the decrease in number of cigarettes smoked in the 11 intervention communities (community mean) was 9.2, compared with 8.9 in the comparison communities; the difference of 0.3 cigarettes per day was not significant ($P = .13$). For the light-to-moderate smoker cohort, the corresponding values were 2.7 and 1.9; the difference of 0.8 reached statistical significance at $P = .03$. These results are consistent with the quit rate analysis.

Intervention Receipt Indices

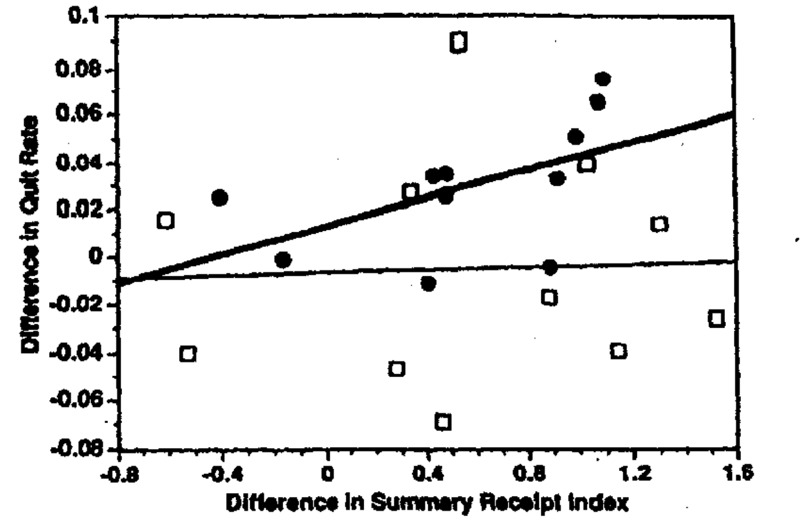
In the heavy smoker cohort, data on intervention receipt indices were available (on average) for 59.4% of members in intervention communities and for 59.1% of members in comparison communities, amounting to a nonsignificant difference in data response rates ($P = .79$); similarly, for the light-to-moderate smoker cohort, these rates were 55.9% and 57.1%, respectively ($P = .20$). The observed data were used without imputation. Results are shown in Table 4; larger values of an index correspond to greater awareness and/or participation. All but two indices in the heavy smoker cohort and all indices in the light-to-moderate smoker cohort showed a difference in favor of the intervention communities although some of these differences were not statistically significant by permutation test. Importantly, the summary measure was significantly greater for the intervention communities in both cohorts ($P = .012$ among heavy smokers and .004 among light-to-moderate smokers).

Even when statistically significant, the magnitudes of the differences in receipt indices were not large. The largest (and most significant) difference in both cohorts was for the index based on the respondents' evaluation of the increase in stop-smoking events and contests in their

community. More details of receipt indices are planned for a future paper. (A list of survey questions contributing to specific receipt indices is available from the authors.)

Relation of Differences in Quit Rates and Receipt Indices

As one way of exploring the variability in quit rate differences across community pairs, we computed a receipt index difference for each community pair (using the standardized summary measure), which we then correlated with the MCAR quit rate difference in each community pair. As seen in Figure 2, the variability across community pairs in receipt index difference did not result in a correlation with differences in quit rates among the heavy smokers (rank order correlation = 0.13, P = .71), but there was a significant correlation among the light-to-moderate smokers (rank order correlation = 0.75, P = .01). This suggests that in the light-to-moderate smoker cohort where the COMMIT intervention did produce a behavioral change, the magnitude of this intervention effect was related to the magnitude of the difference in awareness of (or participation in) smoking control activities.



	Correlation	Rank Correlation
□ — Heavy Cohort	0.04 (p=0.90)	0.13 (p=0.71)
● — Light / Moderate Cohort	0.54 (p=0.09)	0.75 (p=0.01)

Note. MCAR = missing completely at random.

FIGURE 2—Relation of the differences in observed (MCAR) quit rate (between communities in a pair) and the differences in summary intervention receipt index for heavy and light-to-moderate smoker cohorts.

Discussion

The COMMIT intervention did not significantly affect the primary outcome measure—quit rates among heavy smokers—where quitting was defined as having smoked no cigarettes for at least the preceding 6 months at the end of the trial. For the heavy smoker cohort, the mean quit rates for the intervention and comparison communities were nearly identical: 0.180 versus 0.187 (MAR analysis with imputation of missing values). Quitting in the comparison communities was somewhat greater than the expected rate of 0.15, but the anticipated intervention effect of increasing the quit rate to 0.25 clearly was not achieved.

There was, however, a statistically significant intervention effect in the light-to-moderate smoker cohort—quit rates of 0.306 versus 0.275—with the mean difference showing an additional 3% of such smokers quitting. The success of the COMMIT intervention in affecting smoking behavior among light-to-moderate smokers is an important public health finding. As an illustration, when the 3% mean difference in light-to-moderate cessation rates is extrapolated to the community level, it is reasonable to conclude that more than 3000 smokers (in the target age interval of 25 to 64 years) in the 11 intervention communities were induced to quit beyond the naturally occurring secular trend. The higher quit rates for light-to-moderate smokers compared with heavy smokers are consistent with findings from the community trial in California[24] as well as with other smoking cessation studies.[25]

The analyses here showed little difference between men and women in the effect of the COMMIT intervention; there was no benefit for heavy smokers of either sex but there was an additional 3% quitting among light-to-moderate smokers of both sexes. Among light-to-moderate smokers, the less educated subgroup appeared more responsive to the intervention than the college-educated smokers. Given the report that more cessation activity has been occurring nationwide among smokers at higher education levels,[26] it is possible that the type of intervention provided by COMMIT adds little to secular trends among this group, whereas less educated smokers might benefit more from community-based antismoking messages.

The intervention receipt indices provide objective comparisons of the perceived level of activity in intervention and comparison communities. Differences in these indices were mostly in the expected direction, and differences in the summary index were statistically significant for both smoker cohorts. The magnitudes of these differences, however, were modest and may account for the lack of intervention effect for heavy smokers and for the modest intervention effect for light-to-moderate smokers.

The results show a moderately strong rank correlation between pairwise receipt index differences and pairwise quit rate differences for the light-to-moderate smoker cohort. Both heavy and light-to-moderate smokers in the intervention communities had greater perceived exposure to smoking control activities than their counterparts in comparison communities. However, for the heavy smokers, unlike for the light-to-moderate smokers, this exposure was not reflected in higher quit rates. This might be because the receipt of the COMMIT intervention was not large enough to affect heavy smokers, because 4 years was not long enough for a

community intervention to take hold and affect heavy smokers, or because a different type of intervention is necessary.

COMMIT also tried to ascertain intervention delivery and receipt by several special population surveys administered in both intervention and comparison communities. These data are still under analysis and will provide additional information that may help in interpreting the results reported here.

The COMMIT design had a number of important strengths. Intervention was assigned by randomization. Communities were both the unit of assignment and the unit of analysis; the matched pair design,[9] the number of pairs, and the successful matching within pairs[27] yielded sufficient statistical power to detect a relatively modest (but important) 3% difference in light-to-moderate smoking cessation rates. Moreover, the 90% confidence interval of the intervention difference in quit rates among heavy smokers indicates that an actual intervention benefit exceeding two percentage points for heavy smokers is unlikely.

We consider the best estimates of cohort quit rates to be those based on stratum-specific imputation of missing values at final follow-up (MAR analysis). However, using the observed quit rates (MCAR) gave almost the same results. Individuals in the cohorts were not direct participants in the trial but were simply respondents to telephone surveys, and thus missing data were due predominantly to failure to locate people with limited tracking information. Therefore, naive estimation assuming that all unlocated individuals were still smokers would provide such poor estimates of true quit rates as to be of no value, so this was not done.

Self-reports were used to determine trial endpoints. This is because a single biochemical measurement cannot validate sustained quitting (i.e., for 6 months or longer), it may be influenced by other nicotine sources, and it can only be collected from that subset of telephone survey participants willing to volunteer a sample. COMMIT did, however, undertake an ancillary study with salivary cotinine measurements (after all self-reports from cohort members were completed) to estimate the extent of false reporting of quitting and especially to estimate possible differential rates of such misrepresentation. Preliminary analysis of these data showed that misrepresentation rates in quitters from the heavy smoker cohort who participated in the ancillary study were 5.1% in intervention communities versus 7.7% in comparison communities; for the light-to-moderate smoker cohort, the corresponding rates were 6.8% versus 8.8%. These differences were not statistically significant and were in the direction of reduced (rather than greater) false reporting in the intervention communities. Further analyses of this ancillary study will be reported in a later paper. Other researchers also have discussed this topic.[28,29]

There were two notable limitations of the COMMIT intervention that may have affected outcomes. First, the standardized protocol may have constrained some communities from undertaking activities that might have had greater impact. In general, however, community boards seemed quite satisfied with the protocol.[30] Second, the protocol did not permit emphasis on some kinds of policy or environmental changes that might have been quite powerful, such as working toward tax increases on cigarettes.

That the COMMIT intervention did not change quit rates of adult heavy smokers is disappointing but consistent with the findings of most other community studies on smoking cessation.[7,24,31,32] Achieving and maintaining cessation among heavy smokers is difficult. Thus far, only intensive clinical programs and pharmacological interventions have demonstrated a significant effect on the quit rates of heavy smokers,[1,33] and even they have had only a modest impact on cessation rates.

Based on sound principles of experimental design, COMMIT allowed a rigorous evaluation of its community-based intervention. As expected from secular trends, quitting did occur in comparison and intervention communities among heavy as well as light-to-moderate smokers. The intervention had a modest beneficial influence on this trend for light-to-moderate smokers, and thus it did produce an effect on smoking cessation with public health implications. Light-to-moderate smokers were responsive to broad-based community approaches to smoking control, and such efforts should continue. However, addicted heavy smokers are more resistant to change. Reaching these smokers may require new clinical programs and public policy changes.

Comparisons of the cohort results reported here with outcomes from the cross-sectional surveys are presented separately, along with additional discussion of the implications of COMMIT findings.[11] Continuing analyses of data from COMMIT should provide further insights for future community-based health promotion programs. □

References

1. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General.* Washington, DC: US Dept of Health and Human Services, Centers for Disease Control; 1989. DHHS publication CDC 89-8411.
2. *Smoking, Tobacco, and Cancer Program. 1985–1989 Status Report.* Washington, DC: National Cancer Institute; 1990. DHHS publication NIH 90-3107.
3. Syme SL, Alcalay R. Control of cigarette smoking from a social perspective. *Ann Rev Public Health.* 1982;3:179–199.
4. Mittelmark MB, Luepker RV, Jacobs DR, et al. Community-wide prevention of cardiovascular disease: education strategies of the Minnesota Heart Health Program. *Prev Med.* 1986;15:1–17.
5. Carleton RA, Lasater TM, Assaf A, et al. The Pawtucket Heart Health Program: I. an experiment in population-based disease prevention. *R I Med J.* 1987;70:533–538.
6. Farquhar JW, Fortmann SP, Flora JA, et al. Effects of community-wide education on cardiovascular disease risk factors: the Stanford Five-City Project. *JAMA.* 1990;264:359–365.
7. Puska P, Nissinen A, Tuomilehto J, et al. The community-based strategy to prevent coronary heart disease: conclusions from the ten years of the North Karelia project. *Ann Rev Public Health.* 1985;6:147–193.
8. Egger G, Fitzgerald W, Frape G, et al. Results of large scale media antismoking campaign in Australia: North Coast "Quit for Life" programme. *Br Med J.* 1983;287:1125–1128.
9. Gail MH, Byar DP, Pechacek TF, Corle DK, for the COMMIT Study Group. Aspects of statistical design for the Community Intervention Trial for Smoking Cessation (COMMIT). *Controlled Clin Trials.* 1992;13:6–21 [and erratum. *Controlled Clin Trials.* 1993;14:253–254].
10. *The Health Consequences of Smoking: Chronic Obstructive Lung Disease: A Report of the Surgeon General.* Washington, DC: US Dept of Health and Human Services; 1984. DHHS publication PHS 84-50205.
11. COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT): II. changes in adult cigarette smoking prevalence. *Am J Public Health.* 1995;85:193–200.
12. COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT): summary of design and intervention. *J Natl Cancer Inst.* 1991;83:1620–1628.
13. Thompson B, Wallack L, Lichtenstein E, et al., for the COMMIT Research Group. Principles of community organization and partnership for smoking cessation in the Community Intervention Trial for Smoking Cessation (COMMIT). *Int Q Community Health Educ.* 1990–1991;11:187–203.
14. Wallack L, Sciandra R. For the COMMIT Research Group. Media advocacy and public education in the Community Intervention Trial to Reduce Heavy Smoking

(COMMIT). *Int Q Community Health Educ.* 1990-1991;11:205-222.

15. Ockene JK, Lindsay E, Berger L, Hymowitz N, for the COMMIT Research Group. Health care providers as key change agents in the Community Intervention Trial for Smoking Cessation (COMMIT). *Int Q Community Health Educ.* 1990-1991;11:223-237.
16. Sorensen G, Glasgow RE, Corbett K, for the COMMIT Research Group. Promoting smoking control through worksites in the Community Intervention Trial for Smoking Cessation (COMMIT). *Int Q Community Health Educ.* 1990-1991;11:239-257.
17. Pomrehn P, Sciandra R, Shipley R, Lynn W, [illegible], for the COMMIT Research Group. Enhancing resources for smoking cessation through community intervention: CO[illegible] a prototype. *Int Q Community Health Educ.* 1990-1991;11:259-269.
18. Corbett K, Thompson B, White N, Taylor M, [illegible] COMMIT Research Group. Process evaluation in the Community Intervention Trial for Smoking Cessation (COMMIT). *Int Q Community Health Ed*[illegible]91;11:291-309.
19. Lichtenstein [illegible], Hymowitz N, Nettekoven L. The Community Intervention Tr[illegible] Sm[illegible]ation (COMMIT): adapting a [illegible] protocol for diverse [illegible]. In: Richmond R, ed. *Interventions for Smokers: An International Perspective.* [illegible]more, Md: Williams & Wilkins; 1994:259-291.
20. Matts[illegible], Cummings KM, Lynn WR, Giffen C, Corle D, Pechacek T, f[illegible] COMMIT Research Group. Evaluation pla[illegible] Community [illegible]ention [illegible] for Smoking Cessation (COMMIT). *Int Q Community Health Educ.* 1990-19[illegible] 27[illegible].
21. Edgington ES. *Randomization Tests.* [illegible] ed. New [illegible], NY: Marcel Dekker; 1987.
22. Little [illegible], Rubin DB. *Statistical Analysis with [illegible] Data.* New York, NY: [illegible] Wiley & Sons; 1987.
23. Hosmer DW, Lemeshow S. *Applied Logistic Regression.* New York, NY: John Wiley & Sons; [illegible].
24. Fortmann SP, Taylor CB, Flora JA, Jatulis DE. Changes in adult cigarette sm[illegible] pre[illegible] after 5 years of community health education: the Stanford Five-City Project. [illegible] *Epidemiol.* 1993;137:82-96.
25. Ocken[illegible], Hymowitz N, Lagus J, Shaten J, for the MRFIT Research Group. Comparison of smoking behavior change for Special Intervention and Usual Care study groups. [illegible] *Med.* 1991;20:564-573.

APPENDIX A—Key Mandated Activities for COMMIT Task Forces

Public Education
- Provide media advocacy training for community board members
- Implement kick-off event
- Publicize smoking control plans
- Design and implement magnet events[a]
- Publicize activities in other task force areas

Health Care Providers
- Train physicians and dentists as trainers of peers in cessation techniques
- Provide basic and comprehensive training for physicians/dental professionals in smoking-cessation techniques for their patients
- Provide office consultation for motivating and training office staff to support cessation activities
- Promote smokers' network (mailing list)
- Promote smoke-free policies in health care facilities

Work-Sites
- Offer presentations and on-site consultations to promote smoke-free policies in work-sites
- Hold annual smoking policy workshops
- Offer promotional activities accompanying magnet events[a]
- Promote work-site stop-smoking incentives
- Disperse self-help materials
- Promote smokers' network (mailing list)

Cessation Resources
- Develop and maintain a cessation resources guide
- Recruit heavy smokers into a smokers' network (mailing list) through magnet events[a] and other activities
- Prepare and distribute a semiannual newsletter to smokers' network members

[a]For example, Quit & Win contests, the Great American Smokeout, and Canada's Non-Dependence Day.

26. Pierce JP, Fiore MC, Novotny TE, Hatziandreu EJ, Davis RM. Trends in cigarette smoking in the United States: educational differences are increasing. *JAMA.* 1989;261:56-60.
27. Freedman LS, Green SB, Byar DP. Assessing the gain in efficiency due to matching in a community intervention study. *Stat Med.* 1990;9:943-952.
28. Velicer WF, Prochaska JO, Rossi JS, Snow M. Assessing outcome in smoking cessation studies. *Psychol Bull.* 1992;111:23-41.
29. Glasgow RE, Mullooly JP, Vogt TM, et al. Biochemical validation of smoking status: pros, cons, and data from four low-intensity intervention trials. *Addict Behav.* 1993;18:511-527.
30. Thompson B, Corbett K, Bracht N, Pechacek T, for the COMMIT Research Group. Lessons learned from mobilization of communities in the Community Intervention Trial for Smoking Cessation (COMMIT). *Health Promotion Int.* 1993;8:69-83.
31. Luepker RV, Murray DM, Jacobs DR Jr, et al. Community education for cardiovascular disease prevention: risk factor changes in the Minnesota Heart Health Program. *Am J Public Health.* 1994;84:1383-1393.
32. Dwyer T, Pierce JP, Hannam CD, Burke N. Evaluation of the Sydney "Quit for Life" anti-smoking campaign: 2. changes in smoking prevalence. *Med J Aust.* 1986;144:344-347.
33. Schwartz JL. *Review and Evaluation of Smoking Cessation Methods: United States and Canada, 1978-1985.* Bethesda, Md: National Institutes of Health; 1987. NIH publication 87-2940.

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APPENDIX B—A Complete List of Institutions and Individuals Constituting the COMMIT Research Group

Members of the writing group for "Community Intervention Trial for Smoking Cessation (COMMIT): I. Cohort Results from a Four-Year Community Intervention" are indicated by one asterisk; those who wrote "Community Intervention Trial for Smoking Cessation (COMMIT): II. Changes in Adult Cigarette Smoking Prevalence" are indicated by two asterisks. (I) = intervention community; (C) = comparison community.

National Cancer Institute

• *Division of Cancer Prevention and Control; Cancer Control Sciences Program (Bethesda, Md).* Acting Associate Director: Thomas J. Glynn, PhD; Coordinator, Smoking and Tobacco Control Program: Donald R. Shopland.

• *Division of Cancer Prevention and Control; Public Health Applications [illegible]search Branch (Bethesda, Md).* Chief: Marc Manley, MD, MPH; COMMIT Program Director: William R. Lynn, BS.*,**

• *Divis[illegible]ncer Prevention and Control; Biometry Branch (Bethesda, Md).* Acting Chief: Laurence S. Freedman, MA*,**; Lead Research Investigator: Sylvan B. Green, MD*,**; Computer Systems Analyst: Do[illegible]rle, MS*,**; Mathematical Statisticians: Barry Graubard, PhD, Stuart Baker, PhD.

• *Division of Cancer Prevention and Control; Prevention and Control Ext[illegible]search Branch (Bethesda, Md).* Acting Chief: Sherry L. [illegible], MD, MPH; Public Health [illegible]or: Daria A. Chapelsky, [illegible]

• *Division of Cancer Etiology; Biostatistics Branch (Bethesda, Md.)* Head, Epide[illegible]ethods Section: Mitchell Gail, MD, PhD*,**; Medical Statistician: [illegible]ven Mark, MD, ScD.

Chair, Steeri[illegible]ttee

Erwin [illegible]haus, MA, PhD, Michigan State University.

Research In[illegible]

• *American Health Foundation (New [illegible]).* Community pairs: Yonkers (I), New Rochelle (C). Principal Investigator: Mario A. Orlandi, PhD, [illegible]; Co-Principal Investig[illegible]red McAlister, PhD; Co-Invest[illegible]acqueline Royce, PhD; [illegible]e Lewit, PhD; Project Director: [illegible] T. Dalton, BA; Field [illegible]: Avril Dawkins, BA; Commun[illegible]st: Bonni[illegible]an, B[illegible]

• *Fred [illegible]on Canc[illegible]earch [illegible] (Seattle, Wash).* Bellingham (I), Longview/Kel[illegible] (C). Prin[illegible] Investigator: Beti Thompson, PhD; Co-Investig[illegible]ureen [illegible]n, MD, DrPH; Deborah Bo[illegible]; Community Analyst: K. Mark [illegible]eek, MA; Field Director: Julie[illegible]hompson, BA.

• *Kaiser [illegible]ente Medical Care Program, Northern California Region, Division [illegible]search (Oakland, Calif).* Valle[illegible]), Hayward (C). Principal Inve[illegible]: Lawrence Wallack, [illegible]; Co-Investigator: Kitty Corbett, [illegible]; Project Director: Robert McG[illegible]naghan, MPH; Field Director: [illegible] Tosti; Field Director ([illegible]): Joan Bennett, MA.

• *Lovelac[illegible]utes (Albuquerque, NM).* [illegible] (I), Las Cruces (C). Principal Investigator: Neill F. Piland, [illegible]; Project Director: Lawrence R. [illegible], MD, MPH; Commun[illegible]st: Annette M. Phillipp, M[illegible] Field Director: Aile Shebar, R[illegible]

• *Ore[illegible]ch Institute (Eugene, Or[illegible]).* [illegible]dford/Ashland (I), Albany/Corval[illegible]. Principal Investigato[illegible]d Lichtenstein, PhD*,**; Co-Pri[illegible]l Investigator: Russell E. Glasgow, PhD; Project Coordinator: L[illegible]ettekoven, MA; Field Director: Carolyn Johnson, BS; Community [illegible]yst: Shari Reyna, MA.

• *Resear[illegible] Triangle Institute (Research Triangle Park, NC).* Raleigh (I), G[illegible]ro (C). Principal Investigator: Tyler D. Hartwell, PhD**; Co-Pr[illegible]l Investigator: Robert H. Shipley, PhD; Project Director: Da[illegible]tin, MS, MPH; Project Director (until 9/89); Elizabeth T. Walker, BS; Field Director: Len Stanley, MPH; Community Analyst: Bonnie Veaner, MPH; Community Organizer: Carol Stephenson, BS.

• *Roswell Park Cancer Institute (Buffalo, NY).* Utica (I), Binghamton/Johnson City (C). Principal Investigator: K. Michael Cummings, PhD, MPH*,**; Co-Principal Investigator: Terry F. Pechacek, PhD; Project Director: Russell C. Sciandra, MA; Community Analyst: Eva Anderson Sciandra, BS; Field Directors: Janine Sadlik, BS, Sharon Ann Rankins-Burd.

• *University of Iowa (Iowa City, Iowa).* Cedar Rapids (I), Davenport (C). Principal Investigator: Paul R. Pomrehn, MD, MS; Project Director: John E. Ferguson, PhD; Co-Investigators: Kristi J. Ferguson, PhD; Robert B. Wallace, MD, MS; Samuel L. Becker, PhD; Harry A. Lando, PhD (University of Minnesota); Community Analyst: Virginia Daughety, PhD; Community Analyst (until 2/92): Kelly O'Berry, BS; Field Director: Aleena Erickson, BA.

• *University of Massachusetts Medical School (Worcester, Mass.)* Fitchburg/Leominster (I), Lowell (C). Principal Investigator: Judith K. Ockene, PhD*,**; Co-Principal Investigator: Glorian Sorensen, PhD; Project Coordinator: Linda C. Churchill, BS; Field Director: Barbara Silva; Community Organizers: Philip Merriam, MSPH; Gary Donnelly, MPH; Community Analyst: Edward Purcell, BS; Community Analyst (until 7/89): Kristine Sanden, BS.

• *University of Medicine and Dentistry of New Jersey (Newark, NJ).* Paterson (I), Trenton (C). Principal Investigator: Norman Hymowitz, PhD**; Co-Principal Investigators: Lawrence Meinert, MD; Lee B. Reichman, MD; Norman L. Lasser, MD, PhD; John Slade, MD, Project Director: Karel Campbell, BA; Co-Project Director: Janice Marshall, RN, MSN; Field Director: Sharon Jones Rudolph, BS; Community Analyst: Connie Strickland Farrakhan, MA.

• *University of Waterloo (Waterloo, Ontario) and McMaster University (Hamilton, Ontario).* Brantford (I), Peterborough (C). Principal Investigator: J. Allan Best, PhD; Co-Investigators: Roy Cameron, PhD; Charles H. Goldsmith, PhD; Elizabeth A. Lindsay, MS, PhD; Blake D. Poland, PhD; Nancy A. Ross, MA; Edward Smith, DrPH (until 6/89); S. Martin Taylor, PhD; Leslie Van Dover, PhD, RN; Norman F. White, MD; Douglas M.C. Wilson, MD; Mark P. Zanna, PhD; Project Director: Rosemary L. Walker, MSc; Community Analyst: Terri Finch, BA; Field Director: Dianne Ferster.

Coordinating Center

• *Information Management Services, Inc (Silver Spring, Md).* Principal Investigator: Janis A. Beach, AA; Co-Principal Investigator: Carol A. Giffen, DVM*,**; Project Director: Marie A. Topor, BS; Senior Information Specialists: Jerome L. Felix, MA; Lauren E. Rich, BS; Systems Analysts: James J. Rovan, BS; Rusty Shields, BS; Survey Statistician: Charles D. Palit, PhD; Biostatistician: David Pee, MPhil; Project Coordinator: Mary L. Lamb, BA.

Policy Advisory Committee

Chair: Virginia L. Ernster, PhD; Karl Bauman, PhD; David M. Burns, MD; Richard Carleton, MD; William T. Friedewald, MD; Kenneth E. Warner, PhD; Donald Iverson, PhD, also served as Chair (1987–1988); Charles Hennekens, MD, DrPH.

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Predictors of smoking cessation in a cohort of adult smokers followed for five years

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Abstract

Objective—To identify variables predictive of smoking cessation in a cohort of cigarette smokers followed for five years.

Design—Data analysed in this paper come from a cohort tracking telephone survey of 13 415 cigarette smokers aged 25–64 years from 20 American and two Canadian communities who were interviewed in 1988 and re-interviewed in 1993 as part of the National Cancer Institute's Community Intervention Trial for Smoking Cessation. Predictors of smoking cessation evaluated in this study included measures of past and current smoking behaviour, past quit attempts, stated desire to stop smoking, and demographic characteristics.

Outcome measures—Smoking cessation was based on self report. A "quitter" was defined as a cohort member who, at the final annual contact in 1993, reported not smoking any cigarettes for the preceding six months or longer. Any smoker who reported having made a serious quit attempt between 1988 and 1993 was asked to indicate reasons that contributed to their decision to try to stop smoking.

Results—67% of smokers reported making at least one serious attempt to stop smoking between 1988 and 1993 and, of these, were classified as having quit smoking in 1993. The most common reasons given for quitting smoking were concern over health (91%), expense (60%), concern about exposing others to second-hand smoke (56%), and wanting to set a good example for others (55%). Statistically significant predictors of smoking cessation included male gender, older age, higher income, less frequent alcohol intake, lower levels of daily cigarette consumption, longer time to first cigarette in the morning, the use of premium cigarettes, initiation of smoking after age 20, history of past quit attempts, a strong desire to stop smoking, and the absence of other smokers in the household. Predictor variations with the largest relative risks for smoking cessation were those associated with nicotine dependence such as amount smoked daily and time to first cigarette in the morning.

Conclusions—Despite the fact that most smokers expressed a strong desire to stop smoking in 1988, the majority, especially the most dependent heavy smokers (>25 cigarettes/day), struggled unsuccessfully to achieve this goal.

(*Tobacco Control* 1997;6 (suppl 2):S57–S62)

Keywords: smoking cessation predictors

Introduction

Cigarettes cause more illness and death in the United States than anything else.[1] It is well accepted that nicotine in cigarettes contributes to the struggle that many smokers experience in stopping smoking.[2] Despite attempts by the cigarette industry to frame the debate on smoking as the right of each person to choose to smoke or not smoke, the facts speak differently. Surveys show that 70% of smokers wish they could quit[3]; for every smoker who does quit, nine try and fail[4]; and studies have repeatedly shown that the more dependent a person is on nicotine, the more difficulty they have in quitting.[5,6] For example, in a recent study examining predictors of quitting in a cohort of California smokers followed for two years, Farkas *et al* found that measures of nicotine dependence were stronger predictors of quitting than measures of motivation and readiness to stop smoking.[7]

Recent studies have identified a number of variables associated with success in quitting smoking.[8-11] Among these are: smoking fewer cigarettes daily, past quit attempts, higher socioeconomic level, and older age.[9] Female gender, African American race, and recent use of alcohol, on the other hand, have been associated with a lower likelihood of quitting.[9,10,11] The COMMIT study, which tracked the smoking habits of a cohort of smokers over a five-year period, provides a unique opportunity to investigate individual-level predictors of smoking cessation. The following questions were used to guide analyses of data.

- What percentage of smokers express a desire to stop smoking? How many of these actually attempt to quit, and of these how many succeed?
- What are the most common reasons smokers give for quitting smoking? Do the reasons given for quitting smoking differ between those who do or do not succeed in quitting?
- What characteristics of smokers are predictive of success in stopping smoking?

The findings from this study should contribute to our understanding of factors underlying smoking cessation and thus aid in the development of public health interventions to assist smokers in stopping smoking.

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Methods

COMMIT STUDY

The data analysed in this paper come from a longitudinal study involving 13 415 cigarette smokers from 20 American and two Canadian communities who were interviewed in 1988 and re-interviewed in 1993 as part of the National Cancer Institute's Community Intervention Trial for Smoking Cessation (COMMIT) study. The design and primary outcomes have been described previously.

DATA COLLECTION

From January to May 1988, a telephone survey was conducted to identify cohorts of approximately 915 current cigarette smokers aged 25–64 years in each of the 22 study communities (see reference 17 for a list of the 22 COMMIT study communities). The survey was conducted generally using a modified, random-di[illegible]ialling technique and community-specific geographic screening to identify households within the targeted areas. Most of the questions which made up the survey were [illegible]m earlier national surveys of smoking behaviour such as the 1986 Adult Use of Tobac[illegible]ey and the 1987 National Health In[illegible] Survey.[20,21] The survey was implemented in two stages. The first stage involved identifying representative samples averaging [illegible] households within each community and gathering information on the age, gender, and smoking habits of all adults [illegible]in s[illegible]ed households. (This stage is [illegible]rred to [illegible] the rostering stage.) In the second s[illegible] [illegible]mple of current smokers aged 25–64 [illegible] selected for an extended interview [illegible] included questions about current and past [illegible]oking habits, brand and type of cigare[illegible] usually smoked, interest in quitting smoking, alcohol consumption, the presence of other smokers in the household, and sociodemographic characteristics. For the purposes o[illegible]study, current smokers were defined as those who, in 1988, reported having smoked [illegible] 100 cigarettes in their lifetime and who reported smoking at the time of interview.

The mean response rate for the household rostering portion of the survey was 83.7%. Of the eligible smokers identified for the household rostering, 91.5% completed the extended interview. The initial cohort identification survey gathered data on a total of 20 272 current smokers aged 25–64 years who were then followed prospectively until 1993.

Between 1988 and 1992, cohort participants were contacted once per year either by telephone or mail to assess their current smoking status and residency. To ensure that the cohorts remained as representative as possible of their communities, telephone contact with cohort members was kept to a minimum. Thus, although it may have been valuable to question cohort members about their smoking habits during the interim years, such questions were not permitted. However, between January and May 1993 cohort members were asked to respond to a 20-minute telephone interview which included questions about current smoking status, efforts made to stop smoking since 1988, and reasons given for attempting to stop smoking.

Overall, 66.2% of cohort members (n = 13 415) provided information on their smoking status at the final contact in 1993. Most of the cohort members who were classified as non-responders were those who could not be located (29.9%, n = 6052), were deceased (2.4%, n = 492), or refused to participate in the follow-up survey (1.5%, n = 313). Compared with responders to the 1993 follow-up survey, non-responders tended to be younger, single, and had fewer years of formal education.

OUTCOME MEASURES

Smoking cessation was based on self report. A "quitter" was defined as a cohort member who, at the final annual contact in 1993, reported not smoking any cigarettes for the preceding six months or longer. Cohort participants who had quit smoking and those who were still smoking but who reported having made a serious attempt to stop smoking between 1988 and 1993 were asked to indicate whether any of the following reasons were important to them when they last tried to stop smoking: the expense of smoking; concern for current or future health; concern about the effects of passive smoking on others; pressure from family members, friends, and co-workers; restrictions on smoking at work; advice from a health professional; concern about bad breath, bad taste, smell from cigarette smoke; the desire to set a good example for children; and the death of a friend or relative. For each reason, respondents answered "yes" or "no". Thus, it was possible for respondents to mention more than one reason for attempting to stop smoking.

ANALYSIS METHODS

Estimates of the percentage of smokers who attempted to stop smoking between 1988 and 1993, reasons for attempting to stop smoking, and the percentage who were successful in quitting were computed for all cohort members combined and separately for each of the 22 communities in the study. However, only the combined data are presented here, as the focus is on individual-level predictors of smoking cessation. The effect of the COMMIT intervention on the quit rates among cohort members has been described elsewhere.[19] Briefly, the effect of the COMMIT intervention on the quit rate of cohort members was small (an overall average increased quit rate of 1.8%), although statistically significant with a probability value of less than 0.05. To take account of this effect, the relationship between individual-level predictors of smoking cessation are adjusted for the effects of the COMMIT intervention.

Logistic regression analysis was used to assess the association between smoker characteristics measured in 1988 and smoking cessation measured in 1993. Smoker characteristics evaluated in relation to smoking cessation included:

- Age (25–34, 35–44, 45–54, 55–64 years)

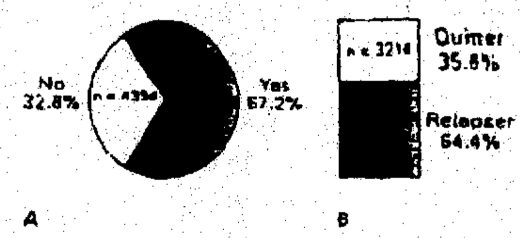

Figure 1 (A) Reported quit attempts and (B) smoking cessation among those who made a serious attempt to quit in a cohort of 13 415 smokers followed between 1988 and 1993

- Gender
- Race/ethnicity (white, black, Hispanic, Asian, American Indian, Canadian, other)
- Average annual household income (<US$10 000, $10 000–$25 000; $25 001–$40 000, >$40 000)
- Time in formal education (<12, 12, 13–15, >15 years)
- Frequency of alcohol consumption (daily, 3–4 times/week, 1–2 times/week, 1–3 times/month, <1 time/month)
- Cigarettes smoked daily (<5, 5–14, 15–24, >25)
- Time to first cigarette in the morning (<10, 10–30, 31–60, >60 minutes)
- Age began smoking (<16, 16–19, >19 years)
- Usual type of cigarette consumed (premium, discount, or generic brand)
- Use of non-cigarette tobacco products (none vs pipe tobacco, cigars, chew or snuff tobacco)
- History of past quit attempts (none, one attempt, more than one attempt)
- Desire to quit smoking (none, a little, somewhat, a lot)
- Presence of another smoker in the household.

Results

QUIT ATTEMPTS AND QUIT RATE

As figure 1 shows, 67.2% of smokers reported having made at least one serious attempt to stop smoking between 1988 and 1993, and of these 32.8% were classified as quitters in 1993. In 1988, when asked the question: "How much do you want to quit smoking?", 67.6% of smokers answered either "somewhat" or "a lot". Among these individuals, 24.6% were classified as quitters in 1993.

REASONS FOR QUITTING

Table 1 shows the reasons given for attempting to quit smoking among cohort members who had quit smoking and those who were still smoking but who reported having made at least one attempt to stop smoking between 1988 and 1993. The most common reasons given for quitting smoking were concern over health (91%), expense (60%), concern about exposing others to secondhand smoke (56%), and wanting to set a good example for others (55%). The rank ordering of different reasons given for stopping smoking was similar between those who quit smoking and those who continued to smoke. However, with the exception of concern over health, endorsed by 90% of continuing smokers as well as quitters, those who continued to smoke were significantly more likely to endorse additional reasons for quitting compared with those who succeeded in stopping smoking.

PREDICTORS OF QUITTING

Table 2 shows the results of the logistic regression analysis relating smoker characteristics measured in 1988 and smoking cessation measured in 1993. Significant predictors of smoking cessation included male gender, older age, higher income, less frequent alcohol intake, lower levels of daily cigarette consumptions, longer time to first cigarette in the morning, the use of premium cigarettes, initiation of smoking after age 20, more than one previous quit attempt, a strong desire to stop smoking, and the absence of other smokers in the household.

Of the various smoker characteristics evaluated, indicators of nicotine dependence, such as amount smoked daily and time to first cigarette of the day, were most strongly correlated with smoking cessation. Figure 2 shows the relationship between the amount smoked daily in 1988 and the likelihood of being classified as a quitter in 1993. A similar relationship is seen when other measures of nicotine dependence are substituted for amount smoked daily. In a simple linear regression analysis where all of the predictor variables measured in this study are included in the model (data not presented), measures of nicotine dependence account for 10 times the variance in smoking cessation than indicators of motivation to stop smoking, such as past quit attempts and expressed desire to quit.

Discussion

The data come from one of the largest community intervention studies ever undertaken to track the smoking habits of a non-clinic based group of smokers over an

Table 1 Reasons for quitting among those who made a serious quit attempt between 1988 and 1993

Reason	Continuing smokers (n = 5807) (%)	Successful quitters (n = 3214) (%)	Total (n = 9021) (%)
Concern for current or future health	90.2	90.2	90.2
Expense associated with smoking*	64.4	52.8	60.7
Concern for the effect of ETS on others*	57.4	52.2	55.8
Setting a good example*	56.4	52.4	55.1
Bad breath, smell, or taste*	49.5	42.8	47.3
Pressure from family, friends, or co-workers*	46.7	37.3	43.7
Advice from doctor or dentist*	44.0	33.7	40.7
Illness or death of a friend or relative*	22.3	17.8	20.9
Smoking restrictions at work*	22.2	14.4	19.7

*P<0.05 for χ^2 test of independence
ETS = environmental tobacco smoke.

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extended period of time. The results of this study are consistent with the larger body of clinic-based research on smoking cessation, which shows that success in stopping smoking is determined by the interplay of multiple factors, including combinations of psychological, physiological, and social processes.

With few exceptions, the variables found to influence smoking cessation among smokers tracked as part of the COMMIT study are the same ones that have been found to be associated with cessation in clinical studies. For example, men were somewhat more successful than women at stopping smoking, and older smokers were more successful than younger ones. Race/ethnicity and education did not emerge as significant predictors when the data were subjected to multivariate analysis, although annual household income was positively associated with quitting. Frequency of alcohol consumption and use of generic cigarettes were inversely related to stopping smoking. Our findings reinforce the predominant view held by medical experts today, which is that maintenance of smoking behaviour in adults is strongly controlled by addiction to nicotine. By far, the most robust predictors of smoking cessation among cohort participants were measures thought to be indicative of strength

See Tab 70, p. A for replicated

Table 2 Results of logistic regression analysis relating smoker characteristics measured in 1988 and smoking cessation measured in 1993* (n = 13 415)

OR

Characteristic	Sample size	Per cent quit	Relative risk	95% CI
Sex				
Male	6599	24.0	1.00	Referent
Female	6816	23.0	0.85	0.78–0.94
Age (years)				
25–34	4749	22.8	1.00	Referent
35–44	4249	22.0	0.90	0.88–1.11
45–54	2817	24.6	1.21	1.06–1.37
55–64	2100	29.3	1.57	1.37–1.81
Race				
White	10 072	23.3	1.00	Referent
Black	982	27.7	0.98	0.82–1.17
Hispanic	657	30.0	1.05	0.87–1.26
Canadian	1449	23.1	0.96	0.81–1.13
Asian	136	28.3	0.90	0.59–1.37
American I	117	20.5	0.89	0.55–1.45
Other	42	33.3	1.49	0.73–3.02
Annual household income (US$)				
000	1139	20.5	1.00	Referent
10 000–25 000	3750	22.2	1.15	0.96–1.36
001–40	4087	24.1	1.34	1.12–1.61
40 000	5456	26.0	1.47	1.22–1.77
[illegible]				
<12	2526	22.4	1.00	Referent
12	3237	23.6	1.03	0.89–1.19
13–15	5367	23.5	1.00	0.87–1.15
≥16	2257	24.9	1.04	0.89–1.23
Frequency of alc[illegible]nsumption				
Daily	1572	20.9	1.00	Referent
3–4 times[illegible]	1289	21.0	0.98	0.80–1.19
1–2 times/week	3064	23.4	1.09	0.93–1.29
1–3 times/month	2299	24.6	1.24	1.04–1.47
<1/month or never	5100	25.6	1.35	1.16–1.57
Cigarettes [illegible] in 1988				
≥25	5564	16.7	1.00	Referent
15–24	4783	22.7	1.15	1.03–1.28
5–14	2356	32.4	1.59	1.38–1.83
<5	695	46.0	2.38	1.92–2.96
Age started [illegible] (years)				
≤15	3225	21.3	1.00	Referent
16–19	6606	23.1	1.03	0.92–1.14
≥20	3584	28.1	1.16	1.01–1.32
Time to first cigarette (minutes)				
<10	4529	17.9	1.00	Referent
10–30	3960	21.1	1.16	1.05–1.33
31–60	2231	26.2	1.41	1.23–1.62
>61	3646	35.9	1.84	1.59–2.14
Use non-cigarette product				
No	13 005	24.0	1.00	Referent
Yes	408	24.3	0.86	0.66–1.12
Type of cigarette				
Premium	12 078	24.4	1.00	Referent
Discount	606	18.6	0.85	0.66–1.06
Generic	173	15.0	0.64	0.41–0.99
Quit attempts				
0	8235	22.6	1.00	Referent
1	2427	24.4	1.07	0.97–1.21
≥2	2717	27.7	1.14	1.01–1.29
Desire to quit				
Not at all	2200	22.2	1.00	Referent
A little	2116	22.9	1.20	1.02–1.40
Somewhat	4216	22.9	1.12	0.98–1.31
A lot	4882	26.0	1.24	1.07–1.44
Number of other household smokers				
0	7206	25.5	1.00	Referent
≥1	6209	22.1	0.87	0.80–0.95

*Adjusted for COMMIT intervention status.
CI = confidence interval.

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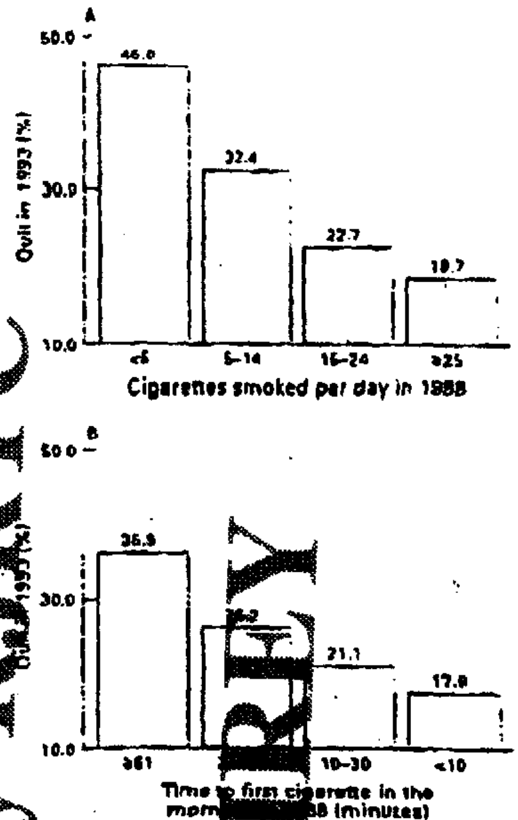

Figure 2 Relationship between measures of strength of nicotine dependence as measured in 1988 (amount smoked and time to first cigarette in the morning) and smoking cessation in 1993

of nicotine dependence (amount smoked daily, time to first cigarette of the day).

The criteria used to define whether or not a person is addicted to a substance vary, but common to most definitions is the concept of compulsive use, even when faced with knowledge that the substance is harmful.[2] The results of this study support the idea that a large percentage of smokers are addicted to cigarettes. For example, a third of smokers enrolled in COMMIT in 1988 reported having made an unsuccessful attempt to stop smoking in the previous year. Between 1988 and 1993, 67% of smokers reported making at least one serious effort to stop smoking between 1988 and 1993, yet only a third of those who attempted to stop smoking were classified as not smoking in 1993. Unfortunately, information about reasons for relapsing was not collected. Most smokers believe that smoking is harmful and that quitting smoking would improve their health.[16] Among smokers who reported making a quit attempt, nearly all mentioned health concerns as an important factor motivating their decision to quit. This result is similar to findings presented by Gilpin *et al* who found that concern about their health was the most important reason smokers gave for stopping smoking.[17] In 1988, two-thirds of smokers expressed either a strong or moderate desire to stop smoking, yet only 24% were not smoking when re-interviewed in 1993. Taken together, these results indicate that most adult smokers are motivated to stop smoking, but are unable to do so easily, especially those who smoke more frequently.

On a practical level, the findings from this research have both public policy and treatment implications. From a public policy perspective, our data support the view that for many smokers, smoking is not a volitional behaviour, but an addiction.[1] Nicotine is believed to be the chemical in tobacco smoke which explains why people continue to use tobacco products.[1] The concept of smoking as an addiction offers a number of interesting, although little used, policy options including: (a) regulation of nicotine-containing cigarettes[18]; (b) the use of cigarette taxes to fund low-cost or free smoking cessation treatment programmes for smokers[19]; (c) tort damage claims by smokers against cigarette manufacturers[20]; and (d) policies protecting smokers from discrimination in employment.[21]

From a treatment perspective, the findings from this study highlight the importance of helping smokers, especially heavier smokers, overcome their need for nicotine. The means to achieve this therapeutic goal could take many forms including, but not limited to, the use of nicotine replacement products, gradual reduction of the number of cigarettes smoked daily, and having smokers switch to cigarettes with less nicotine. Recent practice guidelines on smoking cessation issued by the Agency for Health Care Policy and Research emphasised the need to make support services more accessible to smokers.[22] Heavy smokers are more likely to seek out assistance in quitting smoking, and evidence shows that a dose-response relation exists between the intensity and duration of treatment and its effectiveness.[22,23] Unfortunately, the reality in most healthcare and other settings today is that providers are unable to adequately address the needs of smokers who are highly dependent on nicotine.

Support for this research has been provided by the National Cancer Institute and the Robert Wood Johnson Foundation. We are indebted to our colleagues at the 11 COMMIT research sites, the COMMIT coordinating center, Information Management Services, Inc., and staff at the National Cancer Institute who planned and coordinated the massive data collection activities of the COMMIT study.

1 US Department of Health and Human Services. *Reducing the health consequences of smoking: 25 years of progress. A report of the Surgeon General. 1989.* Rockville, Maryland: Public Health Service, Centers for Disease Control, Office on Smoking and Health, 1989. (DHHS Publication No (CDC) 89-8411.)
2 American Medical Association. *1993 AMA policy compendium.* Chicago, Illinois: American Medical Association, 1993:35.
3 American Psychiatric Association. *Diagnostic and statistical manual of mental disorders: DSM-IV.* 4th ed. Washington, DC: American Psychiatric Association, 1994.
4 World Health Organisation. *International statistical classification of diseases and related health problems.* 10th revision. Vol 1. Geneva, Switzerland: World Health Organisation, 1993.
5 The Royal Society of Canada. *Tobacco, nicotine and addiction.* Ottawa, Ontario: Health Protection Branch, Health and Welfare Canada, 31 August 1989.
6 US Department of Health and Human Services. *The health consequences of smoking: nicotine addiction. A report of the Surgeon General, 1988.* Rockville, Maryland: Public Health Service, Centers for Disease Control, Office on Smoking and Health, 1988. (DHHS Publication No (CDC) 88-8406.)
7 Thomas RAI, Larsen MD. *Smoking prevalence, beliefs, and activities by gender and other demographic indicators.* Princeton, New Jersey: The Gallup Organization, 1993.
8 US Centers for Disease Control. Smoking cessation during the previous year among adults—United States. *MMWR* 1993;42:504-7.

9 Hymowitz N, Sexton M, Ockene J, Grandits G, for the MRFIT Research Group. Baseline factors associated with smoking cessation and relapse. Prev Med 1991;20:590–601.
10 Killen JD, Fortmann SP, Kraemer HC, Varady A, Newman B. Who will relapse? Symptoms of nicotine dependence predict long-term relapse after smoking cessation. J Consult Clin Psychol 1992;60:797–801.
11 Fagerström KO. Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. Addict Behav 1978;3:235–41.
12 Venters MH, Kottke TE, Solberg LI, Brekke ML, Rooney B. Dependency, social factors, and the smoking cessation process: the doctors helping smokers study. Am J Prev Med 1990;6:185–93.
13 Farkas AJ, Pierce JP, Zhu SH, et al. Addiction versus stages of change models in predicting smoking cessation. Addiction 1996;91:1271–80.
14 Fisher EB Jr, Lichtenstein E, Haire-Joshu D. Multiple determinants of tobacco use and cessation. In: Orleans CT, Slade J, eds. Nicotine addiction: principles and management. New York: Oxford University Press, 1993:59–88.
15 Berman BA, Gritz ER. Women and smoking: current trends and issues for the 1990's. J Substance Abuse 1991;3:221–8.
16 Royce JM, Hymowitz N, Corbett K, Hartwell TD, Orlandi MA for the COMMIT Research Group. Smoking cessation factors among African Americans and Whites. Am J Public Health 1993;83:220–6.
17 COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT): summary of design and intervention. J Natl Cancer Inst 1991;83:1620–8.
18 COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT). I. Cohort results from a four-year community intervention. Am J Public Health 199[illegible]2.
19 COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT). II. Changes in adult cigarette smoking prevalence. Am J Public Health 1995;85:193–200.
20 US National Center for Health Statistics. Current estimates from the Health Interview Survey Series 10, No 166. Hyattsville, Maryland: Department of Health, Education and Welfare, 1[illegible]
21 US Centers for Disease Control. Tobacco use in 1986: methods and basic tabulations from Adult Use of Tobacco Survey. Rockville, Maryland: Department of Health and Human Services, 1989.
22 Prochaska JO, DiClemente CC. Stages and processes of self-change in smoking: towards and integrative model of change. J Consult Clin Psychol 1983;51:390–5.
23 Lichtenstein E, Glasgow RE. Smoking cessation: what have we learned over the past decade? J Consult Clin Psychol 1992;60:1–10.
24 US Centers for Disease Control. Smokers' beliefs about the health benefits of smoking cessation—20 U.S. communities. MMWR 1990;39:653–6.
25 Gilpin E, Pierce JP, Goodman J, et al. Reasons smokers give for stopping smoking: do they relate to success in stopping? Tobacco Control 1992;1:256–63.
26 US Food and Drug Administration. Notice: analysis regarding agency jurisdiction: analysis regarding the Food and Drug Administration's jurisdiction over nicotine-containing cigarettes and smokeless tobacco products. Federal Register 1995;60:41453–766.
27 US Food and Drug Administration. Proposed rule: regulations restricting the sale and distribution of cigarettes and smokeless tobacco products to protect children and adolescents. Federal Register 1995;60:41314–75.
28 Benowitz NL, Henningfield JE. Establishing a nicotine threshold for addiction. N Engl J Med 1994;331:123–5.
29 Henningfield JE. Introduction to tobacco harm reduction as a complementary strategy to smoking cessation. Tobacco Control 1995;4(suppl 2):S25–33.
30 Warner KE, Slade J, Sweanor DT. The emerging market for long-term nicotine maintenance. JAMA 1997;278:1087–92.
31 Rabin RL, Sugarman SD. Overview. In: Rabin RL, Sugarman SD, eds. Smoking policy: law, politics and culture. New York: Oxford University Press, 1993:3–13.
32 Fiore MC, Bailey WC, Cohen SJ, et al. Smoking cessation. Clinical Practice Guideline No 18. Rockville, Maryland: US Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, April 1996. (AHCPR Publication No 96-0692.)
33 Fiore MC, Novotny TE, Pierce JP, et al. Methods used to quit smoking in the United States. Do cessation programs help? JAMA 1990;263:2760–5.

Wecker
EXHIBIT NO. 5
12-13-00
GINA GLANTZ

52614 0756

Stata

nqr3s_commit.log

produced by "quitRateRatio.sas" p15

```
. use ":JZY HD:_JZY Work:Rjrfalise:commit:data:commit"

. gen yrborn=1987-age87

. gen yrAge17=yrborn+17

. gen yrBegin=1987

. gen yrEnd=yrborn+ageend

. gen quit=status93==1

. gen w=1

. gen double ID = comcode*1e6 + seq_id*10 + member

. format ID %12.0g

. * Compare Survival Curves by age for entire observation period
. stset yr[illegible] failure(quit) origin (time yrAge17) enter(yrBeg) scale(1)
> id(ID)
(frequency weights assumed)

                id:  ID
     failure event:  quit ~= 0 & quit ~= .
obs. time interval:  (yrEnd[_n-1], yrEnd]
 enter on or after:  time yrBegin
 exit on or before:  failure
    t for analysis:  (time-origin)
            origin:  time yrAge17
            weight:  [fweight=w]

------------------------------------------------------------------------------
    13415  total obs.
        0  exclusions
------------------------------------------------------------------------------
    13415  physical obs. remaining, equal to
    13415  weighted obs., representing
    13415  subjects
     3214  failures in single failure-per-subject data
    72616  total analysis time at risk, at risk from t =         0
                             earliest observed entry t =         7
                                  last observed exit t =        52

. * keep male only
. keep if sex==1
(6816 observations deleted)

. sts generate s = s, by(commit)

. sts generate quit = h, by(commit)

. * Cox proportional hazards comparison of quit rates
. stcox commit

         failure _d:  quit
   analysis time _t:  (yrEnd-origin)
             origin:  time yrAge17
  enter on or after:  time yrBegin
                 id:  ID
             weight:  [fweight=w]

Iteration 0:   log likelihood = -10724.696
Iteration 1:   log likelihood = -10724.393
Iteration 2:   log likelihood = -10724.393
Refining estimates:
Iteration 0:   log likelihood = -10724.393

Cox regression -- Breslow method for ties

No. of subjects =         6599                     Number of obs   =      6599
No. of failures =         1582
Time at risk    =        35724
                                                   LR chi2(1)      =      0.61
Log likelihood  =   -10724.393                     Prob > chi2     =    0.4353

------------------------------------------------------------------------------
      _d | Haz. Ratio   Std. Err.       z     P>|z|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
  commit |   1.040504   .0523692     0.779    0.436      .9422647    1.149[illegible]
------------------------------------------------------------------------------

. stcox commit _age1 _age2 _age3 _race1 _race2 _race3 _race4 _race5 _race6 _inc
> 1 _inc2 _inc3 *
>     * _educ1 _educ2 _educ3 _alc1 _alc2 _alc3 _alc4 _amt1 _amt2 _amt3 _strt1 _
> strt2 _frst1 _frst2 _frst3 *
>     * _[illegible] _[illegible] _[illegible] _[illegible] _[illegible] _want1 _want2 _want3 _[illegible] _[illegible] _[illegible]
> nk _none

         failure _d:  quit
   analysis time _t:  (yrEnd-origin)
             origin:  time yrAge17
  enter on or after:  time yrBegin
```

H proportional hazard model (1st gets H ratio)
see $\P 47$, p2

w(cv 3, p.4 fn 14

commit = 1 if intends to quit/ never continue

U.S.D

U.S., 195 mostly [illegible]

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1

Harry Cole

nqr3s_commit.log

```
                 id:  ID
             weight:  [fweight=w]

Iteration 0:   log likelihood = -9288.2255
Iteration 1:   log likelihood = -9188.7537
Iteration 2:   log likelihood = -9183.0382
Iteration 3:   log likelihood = -9182.9898
Iteration 4:   log likelihood = -9182.9898
Refining estimates:
Iteration 0:   log likelihood = -9182.9898

Cox regression -- Breslow method for ties

No. of subjects =        5841                 Number of obs   =       5841
No. of failures =        1395
Time at risk    =       31619
                                              LR chi2(40)     =     210.47
Log likelihood  =  -9182.9898                 Prob > chi2     =     0.0000
```

_t _d	Haz. Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
commit	1.018284	.0550171	0.334	0.738	.9158859	1.131952
_age1	[illegible]	.1061107	-2.476	0.013	.5000328	.9225099
_age2	.3965642	.0940849	-3.898	0.000	.2490955	.6313367
_age3	.3764147	.1128454	-3.259	0.001	.209163	.6774048
_race1	[illegible]	.0986005	-1.428	0.153	.6739954	1.063866
_race2	[illegible]	.1101227	0.16[illegible]	0.872	.8230676	1.257985
_race3	.9984241	.0996657	-0.016	[illegible]	.8210045	1.214184
_race4	[illegible]	.1817894	-0.86[illegible]	[illegible]	.5367244	1.271623
_race5	.9620515	.270251	-0.13[illegible]	0.890	.554736	1.668439
_race6	1.287508	.5299805	0.61[illegible]	0.539	.5746022	2.884911
_inc1	[illegible]	.1471876	0.89[illegible]	0.37[illegible]	.8701457	1.453459
_inc2	1.191[illegible]	.1568392	1.34[illegible]	[illegible]	.9222989	1.54392
_inc3	1.365459	.1830076	2.32[illegible]	[illegible]	1.050015	1.77567
_educ1	[illegible]	.0910054	0.06[illegible]	[illegible]	.8445392	1.203138
_educ2	[illegible]	.0821096	-0.560	0.576	.804855	1.128251
_educ3	1.02109	.1065712	0.20[illegible]	[illegible]	.832193	1.252864
_alc1	[illegible]	.106635	0.01[illegible]	[illegible]	.8125402	1.233584
_alc2	1.102011	.0981352	1.09[illegible]	[illegible]	.9255199	1.312159
_alc3	1.19742	1177272	1.83[illegible]	[illegible]	.9875493	1.451893
_alc4	1.294526	.110317	3.029	0.002	1.095401	1.529849
_amt1	[illegible]	.0750965	1.96[illegible]	[illegible]	1.000519	1.295813
_amt2	[illegible]	.127461	3.83[illegible]	[illegible]	1.183924	1.686169
_amt3	[illegible]	.226203	4.580	0.000	1.393561	2.289393
_strt1	[illegible]	[illegible]	0.8[illegible]	[illegible]	.9298345	1.213193
_strt2	[illegible]	[illegible]	1.46[illegible]	[illegible]	.9615012	1.315691
_frst1	1.006251	[illegible]	0.089	0.929	.8677657	1.167997
_frst2	[illegible]	.1077619	3.22[illegible]	0.001	1.110157	1.534422
_frst3	1.538543	[illegible]	4.70[illegible]	[illegible]	1.285872	1.840864
_none	.8874006	[illegible]	-0.9[illegible]	[illegible]	.7010361	1.123309
_prem1	[illegible]	.1230069	-1.215	0.22[illegible]	.62694	1.115823
_prem2	[illegible]	.1847987	-1.4[illegible]	[illegible]	.3803091	1.141739
_quit1	[illegible]	.0817248	1.4[illegible]	[illegible]	.9651603	1.28662
_quit2	[illegible]	.0912958	2.542	0.011	1.044856	1.404033
_want1	[illegible]	.0938865	-0.404	[illegible]	.7938803	1.16416
_want2	[illegible]	.0834613	-0.3[illegible]	0.747	.82211	1.150817
_want3	[illegible]	.0874053	0.0[illegible]	[illegible]	.8461123	1.190401
_nums	[illegible]	.0491493	-2.2[illegible]	0.026	.7922141	.9852577
_white	1.026[illegible]	.0733658	0.3[illegible]	[illegible]	.8924634	1.180993
_pink	[illegible]	.0799563	0.508	0.61[illegible]	.8943753	1.208986
_none	[illegible]	.1344187	-1.1[illegible]	[illegible]	.606191	1.141952

```
. * Gompertz without restrictions on common parameters
. streg if commit==0, dist(gompertz)

        failure _d:  quit
  analysis time _t:  (yrEnd-origin)
            origin:  time yrAge17
  enter on or after: time yrBegin
                id:  ID
            weight:  [fweight=w]

Iteration 0:   log likelihood = -15144.178
Iteration 1:   log likelihood =  -746.5351
Iteration 2:   log likelihood =   -672.319
Iteration 3:   log likelihood = -671.61643
Iteration 4:   log likelihood = -671.61605
Iteration 5:   log likelihood = -671.61605

Gompertz regression -- log relative-hazard form

No. of subjects =   [illegible]               Number of obs   =  [illegible]
No. of failures =   [illegible]
Time at risk    =   [illegible]
                                              Wald chi2(0)    =
Log likelihood  =   [illegible]               Prob > chi2     =
```

_t	Haz. Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gamma	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

. predict [illegible] if commit == [illegible]

H 5 [illegible], not [illegible] [illegible] 50 [illegible]

proportional hazards

H model for p1 using [illegible] coding [illegible] adds

[illegible] covariates from [illegible], p1,2

[illegible] paper [illegible] [illegible]

page w/ [illegible]

Gompertz calc 1 p4 curves

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2

nqr3s_commit.log

```
(3352 missing values generated)

. streg if commit==1, dist(gompertz)

         failure _d:  quit
   analysis time _t:  (yrEnd-origin)
             origin:  time yrAge17
  enter on or after:  time yrBegin
                 id:  ID
             weight:  [fweight=w]

Iteration 0:   log likelihood = -15459.203
Iteration 1:   log likelihood = -762.91182
Iteration 2:   log likelihood = -696.94462
Iteration 3:   log likelihood = -696.35653
Iteration 4:   log likelihood = -696.35618
Iteration 5:   log likelihood = -696.35618

Gompertz regression -- log relative-hazard form

No. of subjects =        3352                     Number of obs   =      3352
No. of failures =         815
Time at risk    =       18093
                                                  Wald chi2(0)    =         .
Log likelihood  =  -696.35618                     Prob > chi2     =         .

------------------------------------------------------------------------------
      _t | Haz. Ratio   Std. Err.       z    P>|z|       [95% Conf. Interval]
---------+--------------------------------------------------------------------
------------------------------------------------------------------------------
   gamma |   .015782    .0032765     4.81   0.000       .0093602    .0222038
------------------------------------------------------------------------------

. predict gQuit1 if commit == 1, haz
(3247 missing values generated)

. replace gQuit  gQuit1 if commit == 1
(3352 real           ade)

. gen int Age = _t + 17

. sort commit Age

. drop if Age == Age[_n-1]
(6509 observat    eleted)

. keep Quit      it Age co

. reshape wide Quit Surv gQui       e) j(c
(note:  j = 0 1)

Data                               long
------------------------------------------------------------------------------
Number of obs.                       90   ->   45
Number of variables                   5   ->    7
j variable (2        )           commit   ->   (dropped)
xij variables:
                                   Quit   ->   Quit0 Quit1
                                   Surv   ->   Surv0 Surv1
                                  gQuit   ->   gQuit0 gQuit1
------------------------------------------------------------------------------

. lab var Sur      parison"

. lab var          ervention"

. lab var Qui      parison"

. lab var Qui      tervention"

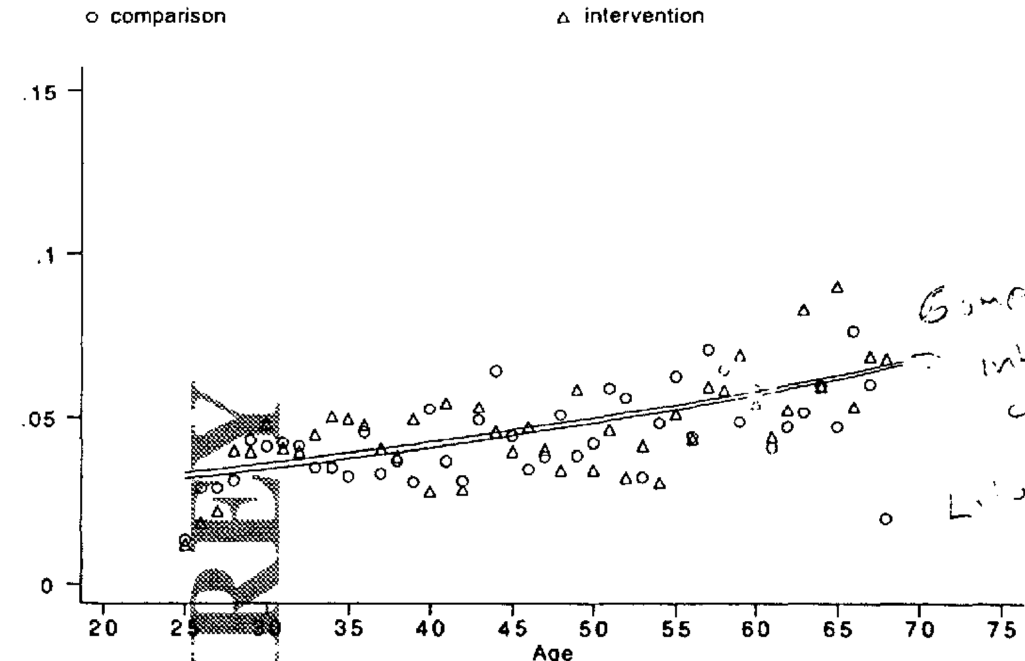
. lab var gQu      omparison"

. lab var gQuit1 "intervention"

. gr Quit" g       ge if Age<=75 ,c(. l1):s(OTii)xlab(20,25,30,35,40,45,50,55,60
> ,65,70,75)ylab(0,.05,.1,.15) /*
>        */ l1(         e")saving(nqr3sc_commit,replace)

. log close
```


52614 0759



COMMIT data

stata

quitRateRatio.sas

```
*options mprint ls=131 ps=45 compress=yes nocenter nodate nonumber source2 mlogic;  *** screen     ***;
*options mprint ls=209 ps=74 compress=yes nocenter nodate nonumber source2 mlogic;  *** landscape6 ***;
*options mprint ls=104 ps=74 compress=yes nocenter nodate nonumber source2 mlogic;  *** 2wide6     ***;
options mprint ps=100 ls=132 compress=yes nocenter nodate nonumber source2 mlogic;  *** portrait6  ***;

libname d001103 '/data05a/rjrfalise/COMMIT/001103';
libname end1988 '/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort';
libname eval1989 '/data05a/rjrfalise/COMMIT/001113/1989_Evaluation_Cohort';
libname eval1991 '/data05a/rjrfalise/COMMIT/001113/1991_Evaluation_Cohort';
libname end1993 '/data05a/rjrfalise/COMMIT/001113/1993_Endpoint_Cohort';
libname eval1993 '/data05a/rjrfalise/COMMIT/001113/1993_Evaluation_Cohort';
libname prev1993 '/data05a/rjrfalise/COMMIT/001113/1993_Prevalence_Survey';
libname jzy v6 '/data05a/rjrfalise/jzy/COMMIT';
%include './commit_endpoint_cohort_data_1988.sasprg';

proc format;
   value status   0='non respondent'
                  1='smoker & quit < 6 month'
                  2='quit > 6 month';
   value statbas  1='heavy smoker'
                  2='light to moderate'
                  3='quit in last 5 years'
                  7='non smoker';

proc sql;
   create table raw as
      select endp88.*, status93, il_5b, il_5bpr2, quityr, statbas, age_det
         from d001103.COMMIT_ENDPOINT_COHORT_DATA_1988 as endp88, end1993.endpnt, end1988.base88_d
         where endpnt.comcode=endp88.comcode and
               endpnt.seq_id=endp88.seq_id and
               endpnt.member=endp88.member and
               endpnt.comcode=base88_d.comcode and
               endpnt.seq_id=base88_d.seq_id and
               endpnt.member=base88_d.member;

data mergeForHarris;
   set raw;
   age87=[illegible];
   quityr2=substr(il_5b,3,2);
   if status93 [illegible] then delete;
   else if status93=1 then ageEnd=age87+93-87;
   else if quityr>=88 & quityr<=93 then do;
      ageEnd=age87+quityr-87;
      yrquit=quityr+0;
      end;
   else if quityr2>=88 & quityr2<=93 then do;
      ageEnd=age87+quityr2-87;
      yrquit=quityr2+0;
      end;
   else if [illegible]99 & il_5b[illegible] then do;
      ageEnd=age87+93-87;
      yrquit=93;
      end;
   format [illegible] statbas. status93 status. quit88 quit88fl. brand88 brand88fl. ;
   male=(sex=1);
   if occdesc [illegible] then blue=1;
   else if occdesc in (1 2) then blue=0;

* start of the program;

      select (sex);
         when(1) _sex=0;
         when(2) _sex=1;
         otherwise;
      end;
      array state ca on ia ma nj nm ny1 ny2 nc or wa;
      do over state;
         state=0;
      end;
      select (comcode);
         when(1)  ca =1;  when(2)  ca =1;
         when(3)  on =1;  when(4)  on =1;
         when(5)  ia =1;  when(6)  ia =1;
         when(7)  ma =1;  when(8)  ma =1;
         when(9)  nj =1;  when(10) nj =1;
         when(11) nm =1;  when(12) nm =1;
         when(13) ny1=1;  when(14) ny1=1;
         when(15) ny2=1;  when(16) ny2=1;
         when(17) nc =1;  when(18) nc =1;
         when(19) or =1;  when(20) or =1;
         when(21) wa =1;  when(22) wa =1;
         otherwise;
      end;
      select (age4cats);
         when(1) do;_age1=0;_age2=0;_age3=0;end;
         when(2) do;_age1=1;_age2=0;_age3=0;end;
         when(3) do;_age1=0;_age2=1;_age3=0;end;
         when(4) do;_age1=0;_age2=0;_age3=1;end;
         otherwise;
      end;
      select (racial);
         when(1)
[illegible]
         when(2)
[illegible]
         when(3)
[illegible]
         when(4)
```

INPUT 88+93
COMMIT data
+ the var for P2-P3P

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quitRateRatio.sas

```
do;_race1=0;_race2=0;_race3=0;_race4=0;_race5=1;_race6=0;end;
        when(5)

do;_race1=0;_race2=0;_race3=0;_race4=0;_race5=0;_race6=1;end;
        when(6)

do;_race1=0;_race2=0;_race3=1;_race4=0;_race5=0;_race6=0;end;
        when(7)

do;_race1=0;_race2=1;_race3=0;_race4=0;_race5=0;_race6=0;end;
*       otherwise;
 end;
select(grossinc);
        when(1) do;_inc1=0;_inc2=0;_inc3=0;end;
        when(2) do;_inc1=1;_inc2=0;_inc3=0;end;
        when(3) do;_inc1=0;_inc2=1;_inc3=0;end;
        when(4) do;_inc1=0;_inc2=0;_inc3=1;end;
        otherwise;
 end;
 select(educdetz);
        when(1) do;_educ1=0;_educ2=0;_educ3=0;end;
        when(2) do;_educ1=1;_educ2=0;_educ3=0;end;
        when(3) do;_educ1=0;_educ2=1;_educ3=0;end;
        when(4) do;_educ1=0;_educ2=0;_educ3=1;end;
        otherwise;
 end;
 select(freqalc);
        when(1) do;_alc1=0;_alc2=0;_alc3=0;_alc4=0;end;
        when(2) do;_alc1=1;_alc2=0;_alc3=0;_alc4=0;end;
        when(3) do;_alc1=0;_alc2=1;_a[illegible]_alc4=0;end;
        when(4) do;_alc1=0;_alc2=[illegible]_alc4=0;end;
        when(5) do;_alc1=0;_alc2=0;_alc3=0;_alc4=1;end;
        otherwise;
 end;
 select(amt[illegible]);
        when(1) do;_amt1=0;_amt2=[illegible]end;
        when(2) do;_amt1=0;_amt2=[illegible]end;
        when(3) do;_amt1=1;_amt2=0;_amt3=0;end;
        when(4) do;_amt1=0;_amt2=[illegible]end;
        otherwise;
 end;
 select(agestrtz);
        when(1) do;_strt1=0;_strt2=0;end;
        when(2) do;_strt1=1;_strt[illegible]
        when(3) do;_strt1=0;_strt2=1;end;
        otherwise;
 end;
 select(frstcigz);
        when(1) do;_[illegible];_frst2[illegible]frst3=0;end;
        when(2) do;_frst1=1;_frst2=0;_frst3=0;end;
        when(3) do;_[illegible];_frst[illegible]0;end;
        when(4) do;_frst1=0;_frst[illegible]1;end;
        otherwise;
 end;
 sele[illegible]iq88);
        when(0) _none=0;
        when(1) _none=1;
        otherwise;
 end;
 select(prem88z);
        when(0) do;_prem1=0;_prem2=0;end;
        when(1) do;_prem1=1;_prem2=0;end;
        when(2) do;_prem1=0;_prem[illegible]
        otherwise;
 end;
 select(quit88);
        when(0) do;_quit1=0;_quit2=0;end;
        when(1) do;_quit1=1;_quit2=0;end;
        when(2) do;_quit1=0;_quit[illegible]
        otherwise;
 end;
 select(wantto);
        when(1) do;_want1=0;_want2=0;_want3=0;end;
        when(2) do;_want1=1;_want2=0;_want3=0;end;
        when(3) do;_want1=0;_want2=1;_want3=0;end;
        when(4) do;_want1=0;_want2=0;_want3=1;end;
        otherwise;
 end;
 select(numsmkz);
        when(0) _nums=0;
        when(1) _nums=1;
        otherwise;
 end;
 select([illegible]);
        when(1)     do;_[illegible]=0;_white=1;_[illegible]=0;_[illegible]=0;end;
        when(2)     [illegible]
        when(3)     [illegible]
        otherwise   [illegible]
 end;
```

[illegible]

[illegible]

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quitRateRatio.sas

```
   merge mergeForHarris (where=(ageEnd=. & status93=-1)) impute (keep=comcode iyrquit);
   by comcode;
   ageEnd=age87+round(iyrquit,1)-87;

data jzy.commit;
   set mergeForHarris (where=(ageEnd^=. | status93=1)) missing;
```


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Computes Tab 73, P3

nqr7_R2.do

```
* @RM500
* nqr7: BL-CF differences in mean smoke-years exposure
* based upon empirical smoke-survival curve and mortality
* of claimants in HRA audit files (excluding Insulator crossovers)
* Relative risk quitting model hC(t) = R1*hB(t) if T2 > year >= T1
* hC(t) = R2*hB(t) if T3 > year >= T2, where T2 > T1
* hC(t) = R3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* Projection to future claimants based upon birth-year distribution pi()
* derived from age9.dta and distribution of ever-smokers by birth cohort
* from nir.dta

clear
prog drop _all
set matsize 400
set rmsg off
set more off

log using nqr7, replace

* Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
* Relative increase in quit rate (on or after year T1) is global variable $R1
* Relative increase in quit rate (on or after year T2) is global variable $R2
* Relative increase in quit rate (on or after year T3) is global variable $R3
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)

* (1a) get distribution of birth year of all future claimants from age9.dta
use age9
keep year AllFutur
mkmat year AllFutur
matrix pi = year,AllFutur
matrix drop year AllFutur
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix list pi
drop _all


* (1b) Compute ever-smoking prevalence by birth cohort from nir.dta
* Note: 'nir.dta' excludes Insulator crossovers
drop _all
use nir
keep coh Smok w
tab coh [w=w], sum(Smok)

* Matrix E holds ever-smoking prevalence by cohort
matrix E = (1880, 1909 \ 1910, 1919 \ 1920, 1929 \ 1930, 1939 \ 1940, 1971 )
matrix E = E, J(5,1,0)
matrix colnames E = t0 t1 Ever

prog def setE
  local i = 1
  while `i' <= 5 {
    qui sum Smok [w=w] if coh == `i'
    matrix E[`i',3] = r(mean)
    local i = `i' + 1
  }
end
setE
matrix li E

* (1c) Compute conditional distribn of birth year pi() among ever smokers
drop _all
svmat pi
ren pi1 t
ren pi2 pi
qui gen pi_ = .
form pi* %9.4f

prog def getpi
 local i = 1
 while `i' <= 5 {
  replace pi_ = pi*E[`i',3] if t >= E[`i',1] & t <= E[`i',2]
*   Note:  In CF with pre-1988 misconduct, ever-smoking prevalence
*   of 1940+ birth cohort will be reduced by 3.6%. (nir4.log),
*    But this feedback effect is very small.
  local i = `i' + 1
 }
 qui sum pi_
 global sumPi = r(mean)*r(N)
 qui replace pi_ = pi_/$sumPi
end
getpi

* Replace pi_ in 2nd col of matrix pi()
mkmat pi_
matrix pi = pi[1..$m,1..1]
matrix pi = pi,pi_


* (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

drop _all
* Get L and SB from nqr4 output
use nqr4
qui sum x
global xMin = r(min)
global N = _N

* LSB is proportion who are still smoking and alive
gen LSB = L*SB
qui sum LSB
* EB is mean smoke-years taking mortality into account
global EB = r(mean)*$N
di "Mean smoke-years (BL) = ",%9.2f $EB
* LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
gen LSBR1 = .
gen LSBR2 = .
gen LSBR3 = .
gen SC = .

prog def LSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global R1 = $_4
  global R2 = $_5
  global R3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }
* Compute SB(x)^R1 and L(x)*SB(x)^R1
* Compute SB(x)^R2 and L(x)*SB(x)^R2
```

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nqr7_R2.do

```
* Compute SB(x)^R3 and L(x)*SB(x)^R3
  qui replace LSBR1 = L*SB^$R1
  qui replace LSBR2 = L*SB^$R2
  qui replace LSBR3 = L*SB^$R3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R1*SB(min(x,T1-t))^(R1-R2)*
* SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while `i' <= $m {
    local t = pi[`i',1]
*   `t' year of birth
    local u1 = $T1 - `t' - $xMin - 1
    local v1 = `u1' + 1
    local u2 = $T2 - `t' - $xMin - 1
    local v2 = `u2' + 1
    local u3 = min($T3 - `t' - $xMin - 1,$N)
    local v3 = `u3' + 1
*   compute intermediate 'areas'
    local A1 = SB[`u1']^($R1-$R1)
    local A2 = SB[`u2']^($R1-$R2)
    local A3 = SB[`u3']^($R2-$R3)
*   `u1' < `u2' < `u3' required
*   case A:
    if `u3' <= 0 {
      qui replace SC = SC + pi[`i',2] * LSBR3
    }
    else {
*   case B
      if `u1' <= 0 & `u2' >= 0 {
        qui replace SC = SC + pi[`i',2] * LSBR2 in 1/`u3'
        if `v3' <= $N {
          qui replace SC = SC + pi[`i',2] * LSBR3 * `A3' in `v3'/$N
        }
      }
      else {
*   case C
        if `u2' > 0 & `u1' <= 0 {
          qui replace SC = SC + pi[`i',2] * LSBR1 in 1/`u2'
          qui replace SC = SC + pi[`i',2] * LSBR2 * `A2' in `v2'/`u3'
          if `v3' <= $N {
            qui replace SC = SC + pi[`i',2] * LSBR3 * `A2' * `A3' in `v3'/$N
          }
        }
        else {
*   case D
          qui replace SC = SC + pi[`i',2] * LSB in 1/`u1'
          qui replace SC = SC + pi[`i',2] * LSBR1 * `A1' in `v1'/`u2'
          qui replace SC = SC + pi[`i',2] * LSBR2 * `A1' * `A2' in `v2'/`u3'
          if `v3' <= $N {
            qui replace SC = SC + pi[`i',2] * LSBR3 * `A1' * `A2' * `A3' in `v3'/$N
          }
        }
      }
    }
    local i = `i' + 1
  }
  qui sum SC
  global EC = r(mean)*$N
  di %7.0f $T1 %7.0f $T2,%7.0f $T3,%9.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB,%8.2f $EC,%8.
2f $EB - $EC
end

prog def rangeSC
  di "     T1       T2       T3       R1       R2       R3       XB       XC    deltaX"
  LSC 1954 1963 2001 1.0 2.1 1.0
  qui gen SC_lo = SC
  lab var SC_lo "SC (R=1 post-2000) low est."
  LSC 1954 1963 2001 1.0 2.1 2.1
  LSC 1954 1963 2001 1.0 2.4 1.0
  LSC 1954 1963 2001 1.0 3.0 1.0
  LSC 1954 1963 2001 1.0 3.6 1.0

  LSC 1954 1963 2001 1.5 2.4 1.0
*****Wecker Change: change 3.0 to 1.0******

   LSC 1954 1963 2001 1.5 3.0 1.0
   LSC 1954 1963 2001 1.5 1.0 1.0

**************End Wecker Change*************

  qui gen SC = SC
  lab var SC_ "SC (R=3 post-2000) middle est."
  LSC 1954 1963 2001 1.5 3.0 3.0
  qui gen SC3 = SC
  lab var SC3 "SC (R=3 post-2000) middle est."

  LSC 1954 1963 2001 1.5 3.6 1.0
  LSC 1954 1963 2001 2.0 2.4 1.0
  LSC 1954 1963 2001 2.0 3.0 1.0
  LSC 1954 1963 2001 2.0 3.6 1.0
  LSC 1954 1963 2001 2.0 3.9 1.0
  qui gen SC_hi = SC
  lab var SC_hi "SC (R=1 post-2000) high est."
  LSC 1954 1963 2001 2.0 3.9 3.9

  LSC 1954 1963 1999 1.5 3.0 1.0
  LSC 1954 1963 2000 1.5 3.0 1.0

end

rangeSC

gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(JJJ)l1("Proportion
 Still Alive and Smoking")saving(nqr7a,replace)
gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iiii)c(JJJJ)l1("Prop
ortion Still Alive and Smoking")saving(nqr7b,replace)

form LSB SC* %7.3f
form x %6.0f
keep x LSB SC_*
l, nod
save nqr7_R2, replace

log close

\032
```

remove asbestos - specific
quit rate effect

BEST IMAGE

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2

nqr7.log

```
.
. * Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
. * Relative increase in quit rate (on or after year T1) is global variable $R1
. * Relative increase in quit rate (on or after year T2) is global variable $R2
. * Relative increase in quit rate (on or after year T3) is global variable $R3
. * (R3 can be any value, not just 1; T3 can be any value, not just 1999)
.
. * (1a) get distribution of birth year of all future claimants from age9.dta
. use ":Thumper:Desktop Folder:FALISE_TASKS:Monday0508:age9"

. keep year AllFutur

. mkmat year AllFutur

. matrix pi = year,AllFutur

. matrix drop year AllFutur

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix list pi

pi[72,2]
```

	t	pi(t)
r1	1900	.00004113
r2	1901	.00002101
r3	1902	.00003102
r4	1903	.00004538
r5	1904	.00006578
r6	1905	.00009443
r7	1906	.00013421
r8	1907	.0001888
r9	1908	.00026279
r10	1909	.00036178
r11	1910	.00049251
r12	1911	.00066282
r13	1912	.00088162
r14	1913	.00115874
r15	1914	.00150459
r16	1915	.00192976
r17	1916	.00244442
r18	1917	.00305756
r19	1918	.00377616
r20	1919	.00460425
r21	1920	.00554198
r22	1921	.00658479
r23	1922	.00772278
r24	1923	.00894043
r25	1924	.01021674
r26	1925	.01152602
r27	1926	.01283937
r28	1927	.01412696
r29	1928	.0153611
r30	1929	.01652004
r31	1930	.0175923
r32	1931	.01858097
r33	1932	.01950742
r34	1933	.02041352
r35	1934	.02136119
r36	1935	.02242851
r37	1936	.02370143
r38	1937	.02526133
r39	1938	.02716819
r40	1939	[illegible]
r41	1940	[illegible]
r42	1941	[illegible]
r43	1942	[illegible]
r44	1943	.04074331
r45	1944	.04321814
r46	1945	.04507414
r47	1946	.04608816
r48	1947	.04609812
r49	1948	.0450277
r50	1949	.04289862
r51	1950	.03982827
r52	1951	.03601309
r53	1952	.03170149
r54	1953	[illegible]
r55	1954	[illegible]
r56	1955	[illegible]
r57	1956	[illegible]
r58	1957	.01117046
r59	1958	.00837034
r60	1959	.00611337
r61	1960	.00435552
r62	1961	.00303046
r63	1962	.00206233
r64	1963	.00137566
r65	1964	.00090207
r66	1965	.00058381
r67	1966	.00037486
r68	1967	.0002404
r69	1968	.00015518
r70	1969	.00010166
r71	1970	.0000681
r72	1971	.00017831

```
. drop _all

.
.
. * (1b) Compute ever-smoking prevalence by birth cohort from nir.dta
. * Note: 'nir.dta' excludes Insulator crossovers
. drop _all

. use ":Thumper:Desktop Folder:FALISE_TASKS:Report 6:nir"

. keep coh Smok w

. tab coh [w=w], sum(Smok)
(analytic weights assumed)
```

	Summary of Smoked?			
cohort	Mean	Std. Dev.	Freq.	Obs.
-1909	.65828276	.47546956	846463	201
1910-19	.78556302	.41063019	5166357	1032
1920-29	.79826907	.40141712	11307582	1609
1930-39	.75219631	.43200298	7859782	813
1940-	.7517905	.43243825	5989541	466
Total	.77181249	.41971504	31169725	4121

```
.
. * Matrix E holds ever-smoking prevalence by cohort
```

nqr7.log

```
. matrix E = (1880, 1909 \ 1910, 1919 \ 1920, 1929 \ 1930, 1939 \ 1940, 1971 )

. matrix E = E, J(5,1,0)

. matrix colnames E = t0 t1 Ever

.
. prog def setE
  1.   local i = 1
  2.   while `i' <= 5 {
  3.     qui sum Smok [w=w] if coh == `i'
  4.     matrix E[`i',3] = r(mean)
  5.     local i = `i' + 1
  6.   }
  7. end

. setE

. matrix li E

E[5,3]
          t0         t1       Ever
r1      1880       1909  .65828276
r2      1910       1919  .78556302
r3      1920       1929  .79826907
r4      1930       1939  .75219631
r5      1940       1971   .7517905

.
. * (1c) Compute conditional distribn of birth year pi() among ever smokers
.
. drop _all

. svmat pi
number of observations will be reset to 72
Press any key to continue, or Break to abort
obs was 0, now 72

. ren pi1 t

. ren pi2 pi

. qui gen pi_ = .

. form pi* %9.4f

.
. prog def getpi
  1.  local i = 1
  2.  while `i' <= 5 {
  3.    replace pi_ = pi*E[`i',3] if t >= E[`i',1] & t <= E[`i',2]
  4. *    Note:  In CF with pre-1988 misconduct, ever-smoking prevalence
. *    of 1940+ birth cohort will be reduced by 3.6%. (nir4.log).
. *    But this feedback effect is very small.
.    local i = `i' + 1
  5.  }
  6.  qui sum pi_
  7.  global sumPi = r(mean)*r(N)
  8.  qui replace pi_ = pi_/$sumPi
  9. end

. getpi
(10 real changes made)
(10 real changes made)
(10 real changes made)
(10 real changes made)
(32 real changes made)

. * Replace pi_ in 2nd col of matrix pi()
. mkmat pi_

. matrix pi = pi[1..$m,1..1]

. matrix pi = pi,pi_

.
. * (2) Compute Mean Years Smoked Among Persons Who Ever Smoked
.
. drop _all

. * Get L and SB from nqr4 output
. use "::Humpty:Desktop Folder:FALSE_TASKS:Report 6:nqr4"

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * LSB is proportion who are still smoking and alive
. gen LSB = L*SB

. qui sum LSB

. * EB is mean smoke-years taking mortality into account
. global EB = r(mean)*$N

. di "Mean smoke-years (BL) = ",%9.2f $EB
Mean smoke-years (BL) =      45.43

. * LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
. gen LSBR1 = .
(82 missing values generated)

. gen LSBR2 = .
(82 missing values generated)

. gen LSBR3 = .
(82 missing values generated)

. gen SC = .
(82 missing values generated)

.
. prog def LSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
.   global T1 = $_1
  2.    global T2 = $_2
  3.    global T3 = $_3
  4.    global R1 = $_4
  5.    global R2 = $_5
  6.    global R3 = $_6
  7. * Check T3 > T2 > T1
.   if $T2 <= $T1 | $T3 <= $T2 {
  8.      di "Invalid ",%9.0f $T1,$T2,$T3
  9.      exit
 10.     }
```


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nqr7.log

BONNY [illegible]

```
11. * Compute SB(x)^R1 and L(x)*SB(x)^R1
. * Compute SB(x)^R2 and L(x)*SB(x)^R2
. * Compute SB(x)^R3 and L(x)*SB(x)^R3
.   qui replace LSBR1 = L*SB^$R1
12.   qui replace LSBR2 = L*SB^$R2
13.   qui replace LSBR3 = L*SB^$R3
14.   qui replace SC = 0
15. * Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
. * SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
. * Sum over index 'i' (rows of pi)
.   local i = 1
16.   while 'i' <= $m {
17.     local t = pi['i',1]
18. *   't' year of birth
.     local u1 = $T1 - 't' - $xMin + 1
19.     local v1 = 'u1' + 1
[illegible]
.     local u3 = min($T3 - 't' - $xMin + 1,$N)
[illegible]
. *     ... intermediate "breaks"
[illegible]
27. *   'u2' > 'u1' required
[illegible]
          qui replace SC = SC + pi['i',2] * LSBR3
[illegible]
          if 'u2' > 0 & 'u2' <= 0 {
            qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
            if 'u3' <= $N {
34.           qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
[illegible]
37.       else {
38. *   case C:
          if 'u1' > 0 & 'u1' <= 0 {
              qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
              qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
              if 'v3' <= $N {
                qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/
43.
44.
45.           else {
46. *   case D:
          qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
47.         qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
48.         qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u
49.         if 'v3' <= $N {
50.           qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' i
51.
52.       }
53.     }
54.   }
55.     local i = 'i' + 1
56.   }
57.   qui sum SC
58.   global EC = r(mean)*$N
59.   di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB
> ,%8.2f $EC,%8.2f $EB - $EC
60. end

. program def rangeSC
1. di "   T1      T2      T3      R1      R2      R3      XB      XC
> deltaX"
2.
. LSC 1954 1963 2001 1.0 2.1 1.0
3.   qui gen SC_lo = SC
4.   lab var SC_lo "SC (R=1 post-2000) low est."
5.   LSC 1954 1963 2001 1.0 2.1 2.1
6.   LSC 1954 1963 2001 1.0 2.4 1.0
7.   LSC 1954 1963 2001 1.0 3.0 1.0
8.   LSC 1954 1963 2001 1.0 3.6 1.0
9.
10.  LSC 1954 1963 2001 1.0 3.0 1.0
.  *****Wecker Change: changed 3.0 to 1.0******
.  LSC 1954 1963 2001 1.5 3.6 1.0
.  LSC 1954 1963 2001 1.5 1.0 1.0
11.
.  **************End Wecker Change*************

.  qui gen SC_ = SC
12.  lab var SC_ "SC (R=1 post 2000) middle est."
13.  LSC 1954 1963 2001 1.5 3.0 3.0
14.  qui gen SC3 = SC
15.  lab var SC3 "SC (R=3 post-2000) middle est."
16.
.  LSC 1954 1963 2001 1.5 3.6 1.0
17.  LSC 1954 1963 2001 2.0 2.4 1.0
18.  LSC 1954 1963 2001 2.0 3.0 1.0
19.  LSC 1954 1963 2001 2.0 3.6 1.0
20.  LSC 1954 1963 2001 2.0 3.9 1.0
21.  qui gen SC_hi = SC
22.  lab var SC_hi "SC (R=1 post-2000) high est."
23.  LSC 1954 1963 2001 2.0 3.9 3.9
24.
.  LSC 1954 1963 1999 1.5 3.0 1.0
25.  LSC 1954 1963 2000 1.5 3.0 1.0
26.

. end

. rangeSC
```

T1	T2	T3	R1	R2	R3	XB	XC	deltaX
1954	1963	2001	1.0	2.1	1.0	45.43	37.06	8.37
1954	1963	2001	1.0	2.1	2.1	45.43	34.47	10.96
1954	1963	2001	1.0	2.4	1.0	45.43	35.34	10.09
1954	1963	2001	1.0	3.0	1.0	45.43	32.42	13.01
1954	1963	2001	1.0	3.6	1.0	45.43	30.03	15.40
1954	1963	2001	1.5	2.4	1.0	45.43	35.12	10.31
1954	1963	2001	1.5	1.0	1.0	45.43	45.11	0.32
1954	1963	2001	1.5	3.0	3.0	45.43	29.53	15.90
1954	1963	2001	1.5	3.6	1.0	45.43	29.85	15.58
1954	1963	2001	2.0	2.4	1.0	45.43	34.90	10.52
1954	1963	2001	2.0	3.0	1.0	45.43	32.03	13.40
1954	1963	2001	2.0	3.6	1.0	45.43	29.68	15.75
1954	1963	2001	2.0	3.9	1.0	45.43	28.65	16.77
1954	1963	2001	2.0	3.9	3.9	45.43	26.30	19.13
1954	1963	1999	1.5	3.0	1.0	45.43	32.75	12.68

remove asbestos-specific quit rate effect

(future)

5

nqr7.log

```
  1954    1963    2000     1.5     3.0     1.0    45.43    32.48    12.95

. gr SC_ LSB x if x<=75,ylab(0,.25,.5,[illegible])xlab(20,[illegible],40,[illegible],70)s(iii)c(JJJ)l1
> ("Proportion Still Alive and Smoking")saving(nqr7a,replace)
(Note: file nqr7a.gph not found)

. gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(
> JJJ)l1("Proportion Still Alive and Smoking")saving(nqr7b,replace)
(Note: file nqr7b.gph not found)

. form LSB SC* %7.3f

. form x %6.0f

. keep x LSB SC_*

. l, nod
```

	x	LSB	SC_lo	SC_	SC_hi
1.	17	1.000	1.000	1.000	1.000
2.	18	1.000	1.000	1.000	1.000
3.	19	0.999	0.998	0.998	0.996
4.	20	0.994	0.990	0.993	0.983
5.	21	0.990	0.984	0.989	0.972
6.	22	0.977	0.962	0.974	0.933
7.	23	0.973	0.956	0.971	0.922
8.	24	0.967	0.945	0.964	0.903
9.	25	0.963	0.937	0.959	0.890
10.	26	0.959	0.930	0.955	0.879
11.	27	0.954	0.922	0.950	0.865
12.	28	0.951	0.917	0.947	0.856
13.	29	0.946	0.908	0.941	0.841
14.	30	0.939	0.895	0.934	0.818
15.	31	0.934	0.886	0.928	0.803
16.	32	0.925	0.869	0.919	0.776
17.	33	0.922	0.863	0.915	0.765
18.	34	0.910	0.842	0.904	0.731
19.	35	0.900	0.823	0.893	0.701
20.	36	0.895	0.814	0.888	0.688
21.	37	0.891	0.806	0.884	0.675
22.	38	0.883	0.792	0.876	0.654
23.	39	0.873	0.773	0.865	0.625
24.	40	0.859	0.749	0.852	0.590
25.	41	0.852	0.736	0.844	0.571
26.	42	0.835	0.708	0.828	0.531
27.	43	0.822	0.685	0.814	0.500
28.	44	0.810	0.665	0.803	0.475
29.	45	0.791	0.634	0.784	0.435
30.	46	0.776	0.611	0.768	0.407
31.	47	0.760	0.587	0.753	0.379
32.	48	0.742	0.560	0.735	0.349
33.	49	0.730	0.544	0.723	0.332
34.	50	0.706	0.512	0.699	0.299
35.	51	0.695	0.493	0.689	0.287
36.	52	0.678	0.479	0.672	0.268
37.	53	0.659	0.457	0.653	0.250
38.	54	0.642	0.437	0.635	0.233
39.	55	0.618	0.413	0.613	0.214
40.	56	0.596	0.392	0.590	0.199
41.	57	0.573	0.370	0.568	0.184
42.	58	0.559	0.357	0.553	0.175
43.	59	0.536	0.338	0.530	0.163
44.	60	0.510	0.317	0.505	0.151
45.	61	0.492	0.303	0.487	0.143
46.	62	0.473	0.288	0.468	0.135
47.	63	[illegible]	[illegible]	0.443	[illegible]
48.	64	[illegible]	[illegible]	[illegible]	0.118
49.	65	[illegible]	[illegible]	[illegible]	0.112
50.	66	[illegible]	[illegible]	[illegible]	0.105
51.	67	0.374	[illegible]	0.370	0.100
52.	68	0.355	0.207	0.352	0.095
53.	69	0.335	0.194	0.331	0.089
54.	70	0.316	0.182	0.313	0.083
55.	71	0.299	0.172	0.296	0.078
56.	72	0.285	0.163	0.282	0.075
57.	73	0.273	0.156	0.271	0.071
58.	74	0.260	0.149	0.258	0.068
59.	75	0.250	0.143	0.247	0.065
60.	76	0.236	0.134	0.233	0.061
61.	77	0.222	0.127	0.220	0.058
62.	78	[illegible]	0.121	0.211	0.055
63.	79	0.203	0.116	0.201	0.053
64.	80	[illegible]	0.109	0.189	0.050
65.	81	[illegible]	0.100	0.174	0.046
66.	82	0.167	0.095	0.165	0.043
67.	83	0.161	0.092	0.160	0.042
68.	84	0.159	0.091	0.158	0.042
69.	85	0.158	0.090	0.156	0.041
70.	86	0.157	0.089	0.155	0.041
71.	87	0.149	0.085	0.148	0.039
72.	88	0.141	0.081	0.140	0.037
73.	89	0.127	0.072	0.125	0.033
74.	90	0.126	0.072	0.125	0.033
75.	91	0.126	0.072	0.125	0.033
76.	92	0.126	0.072	0.125	0.033
77.	93	0.126	0.072	0.125	0.033
78.	94	0.117	0.067	0.116	0.030
79.	95	0.117	0.067	0.116	0.030
80.	96	0.117	0.067	0.116	0.030
81.	97	0.117	0.067	0.116	0.030
82.	98	0.117	0.067	0.116	0.030

```
. save nqr7_R2, replace
(Note: file nqr7_R2.dta not found)
file nqr7_R2.dta saved

.
.
. log close
```


6

nqr8_R2.do

```
* @RM500
* nqr8: BL-CF differences in mean smoke-years exposure
* based upon empirical smoke-survival curve and mortality
* of claimants in HRA audit files
* Relative risk quitting model hC(t) = R1*hB(t) if T2 > year >= T1
* hC(t) = R2*hB(t) if T3 > year >= T2, where T2 > T1
* hC(t) = R3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* Scenario     pre-88 misconduct     Estimate     R1     R2     R3
*    BL              -                  -        1.0    1.0    1.0
*    CF             yes                low       1.0    2.1    1.0
*    CF             yes                mid       1.5    3.0    1.0
*    CF             yes                high      2.0    3.9    1.0

* Input files: nqr, nqr4
clear
prog drop _all
set matsize 800
set rmsg off
set more off

log using nqr8, replace

* Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
* Relative increase in quit rate (on or after year T1) is global variable $R1
* Relative increase in quit rate (on or after year T2) is global variable $R2
* Relative increase in quit rate (on or after year T3) is global variable $R3
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)


* (1) Conditional distribn of birth year pi() among "past" ever smokers

use nqr
* Save distribution of yrborn in Matrix pi(t)
qui tab yrborn [w=w], matcell(pi) matrow(t_)
matrix pi = pi/_result(1)
matrix pi = t_, pi
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix drop t_
*matrix list pi

* (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

drop _all
* Get L and SB from nqr4 output
use nqr4
qui sum x
global xMin = r(min)
global N = _N

* LSB is proportion who are still smoking and alive
gen LSB = L*SB
qui sum LSB
* EB is mean smoke-years taking mortality into account
global EB = r(mean)*$N
di "Mean smoke-years (BL) = ",%9.2f $EB
* LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
gen LSBR1 = .
gen LSBR2 = .
gen LSBR3 = .
gen SC = .
```

```
prog def LSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global R1 = $_4
  global R2 = $_5
  global R3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
  }
* Compute SB(x)^R1 and L(x)*SB(x)^R1
* Compute SB(x)^R2 and L(x)*SB(x)^R2
* Compute SB(x)^R3 and L(x)*SB(x)^R3
  qui replace LSBR1 = L*SB^$R1
  qui replace LSBR2 = L*SB^$R2
  qui replace LSBR3 = L*SB^$R3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
* SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
*   't' year of birth
    local u1 = $T1 - 't' - $xMin - 1
    local v1 = 'u1' + 1
    local u2 = $T2 - 't' - $xMin - 1
    local v2 = 'u2' + 1
    local u3 = min($T3 - 't' - $xMin - 1,$N)
    local v3 = 'u3' + 1
*   Compute intermediate 'areas'
    local A1 = SB['u1']^(1-$R1)
    local A2 = SB['u2']^($R1-$R2)
    local A3 = SB['u3']^($R2-$R3)
*   'u3' > 'u2' > 'u1' required
*   Case A:
    if 'u3' <= 0 {
      qui replace SC = SC + pi['i',2] * LSBR3
    }
    else {
*   Case B:
      if 'u3' > 0 & 'u2' <= 0 {
        qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
        if 'v3' <= $N {
          qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
        }
      }
      else {
*   Case C:
        if 'u2' > 0 & 'u1' <= 0 {
          qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
          qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
          if 'v3' <= $N {
            qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/$N
          }
        }
        else {
*   Case D:
          qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
          qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
          qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u3'
```

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nqr8_R2.do

```
        if `v3' <= $N {
          qui replace SC = SC + pi[`i',2] * LSBR3 * `A1' * `A2' * `A3' in `v3'/$N
        }
      }
    }
  }
  local i = `i' + 1
 }
 qui sum SC
 global EC = r(mean)*$N
 di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB,%8.2f $EC,%8.
2f $EB - $EC
end

prog def rangeSC
 di "      T1      T2      T3      R1      R2      R3      XB      XC    deltaX"

 LSC 1954 1963 2001 1.0 2.1 1.0
 qui gen SC_lo = SC
 lab var SC_lo "SC (R=1 post-2000) low est."
 LSC 1954 1963 2001 1.0 2.1 2.1
 LSC 1954 1963 2001 1.0 2.4 1.0
 LSC 1954 1963 2001 1.0 3.0 1.0
 LSC 1954 1963 2001 1.0 3.6 1.0

 LSC 1954 1963 2001 1.5 2.4 1.0

 ******Wecker Change: change 3.0 to 1.0******

 *LSC 1954 1963 2001 1.5 3.0 1.0
  LSC 1954 1963 2001 1.5 1.0 1.0

 **************End Wecker Change************

 qui gen SC_ = SC
 lab var SC_ "SC (R=1 post-2000) middle est."
 LSC 1954 1963 2001 1.5 3.0 3.0
 qui gen SC3 = SC
 lab var SC3 "SC (R=3 post-2000) middle est."

 LSC 1954 1963 2001 1.5 3.6 1.0
 LSC 1954 1963 2001 2.0 2.4 1.0
 LSC 1954 1963 2001 2.0 3.0 1.0
 LSC 1954 1963 2001 2.0 3.6 1.0
 LSC 1954 1963 2001 2.0 3.9 1.0
 qui gen SC_hi = SC
 lab var SC_hi "SC (R=1 post-2000) high est."
 LSC 1954 1963 2001 2.0 3.9 3.9

 LSC 1954 1963 1999 1.5 3.0 1.0
 LSC 1954 1963 2000 1.5 3.0 1.0

end

rangeSC

gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1("Proportio
n Still Alive and Smoking")saving(nqr8a,replace)
gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(JJJ)l1("Pro
portion Still Alive and Smoking")saving(nqr8b,replace)

form LSB SC* %7.3f
form x %6.0f

keep x LSB SC_*
l, nod
save nqr8_R2, replace

log close

\032
```


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8

nqr8.log

```
.
. * Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
. * Relative increase in quit rate (on or after year T1) is global variable $R1
. * Relative increase in quit rate (on or after year T2) is global variable $R2
. * Relative increase in quit rate (on or after year T3) is global variable $R3
. * (R3 can be any value, not just 1; T3 can be any value, not just 1994)
.
. * (1) Conditional distribn of birth year pi() among *past* ever smokers

. use nqr

. * Save distribution of yrborn in Matrix pi(t)
. qui tab yrborn [w=w], matcell(pi) matrow(t_)

. matrix pi = pi/_result(1)

. matrix pi = t_, pi

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix drop t_

. *matrix list pi

. * (2) Compute Mean Years Smoked Among Persons Who Ever Smoked
.
. drop _all

. * Get L and SB from nqr4 output
. use nqr4

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * LSB is proportion who are still smoking and alive
. gen LSB = L*SB

. qui sum LSB

. * EB is mean smoke-years taking mortality into account
. global EB = r(mean)*$N

. di "Mean smoke-years (BL) = ",%9.2f $EB
Mean smoke-years (BL) =       45.43

. * LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
. gen LSBR1 = .
(82 missing values generated)

. gen LSBR2 = .
(82 missing values generated)

. gen LSBR3 = .
(82 missing values generated)

. gen SC = .
(82 missing values generated)

. prog def LSC
 1. $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
   global T1 = $_1
 2.   global T2 = $_2
 3.   global T3 = $_3
 4.   global R1 = $_4
 5.   global R2 = $_5
 6.   global R3 = $_6
 7. * Check T3 > T2 > T1
   if $T2 <= $T1 | $T3 <= $T2 {
 8.     di "Invalid ",%9.0f $T1,$T2,$T3
 9.     exit
 10.    }
 11. * Compute SB(x)^R1 and L(x)*SB(x)^R1
 . * Compute SB(x)^R2 and L(x)*SB(x)^R2
 . * Compute SB(x)^R3 and L(x)*SB(x)^R3
 .   qui replace LSBR1 = L*SB^$R1
 12.   qui replace LSBR2 = L*SB^$R2
 13.   qui replace LSBR3 = L*SB^$R3
 14.   qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
. * SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
. * Sum over index `i' (rows of pi)
.   local i = 1
 16.   while `i' <= $m {
 17.     local t = pi[`i',1]
 18. *   `t' year of birth
.     local u1 = $T1 - `t' - $xMin - 1
 19.     local v1 = `u1' + 1
 20.     local u2 = $T2 - `t' - $xMin - 1
 21.     local v2 = `u2' + 1
 22.     local u3 = min($T3 - `t' - $xMin - 1,$N)
 23.     local v3 = `u3' + 1
 24. *   Compute intermediate 'areas'
.     local A1 = SB[`u1']^(1-$R1)
 25.     local A2 = SB[`u2']^($R1-$R2)
 26.     local A3 = SB[`u3']^($R2-$R3)
 27. *   `u3' > `u2' > `u1' required
. *   Case A:
.     if `u3' <= 0 {
 28.       qui replace SC = SC + pi[`i',2] * LSBR3
 29.     }
 30      else {
 31. *     Case B:
.       if `u3' > 0 & `u2' <= 0 {
 32.         qui replace SC = SC + pi[`i',2] * LSBR2 in 1/`u3'
 33.         if `v3' <= $N {
 34.           qui replace SC = SC + pi[`i',2] * LSBR3 * `A3' in `v3'/$N
 35.         }
 36.       }
 37.       else {
 38. *     Case C:
.        if `u2' > 0 & `u1' <= 0 {
 39.           qui replace SC = SC + pi[`i',2] * LSBR1 in 1/`u2'
 40.           qui replace SC = SC + pi[`i',2] * LSBR2 * `A2' in `v2'/`u3'
 41.           if `v3' <= $N {
 42.             qui replace SC = SC + pi[`i',2] * LSBR3 * `A2' * `A3' in `v3'/
> $N
 43.           }
 44.         }
 45.         else {
```

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nqr8.log

```
46.  *   Case D:
         qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
47.          qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
48.          qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'u2'/'v3'
> 3'
49.          if 'v3' <= $N {
50.            qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' i
> n 'v3'/$N
51.          }
52.        }
53.      }
54.    }
55.    local i = 'i' + 1
56.  }
57.  qui sum SC
58.  global EC = r(mean)*$N
59.  di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB
> ,%8.2f $EC,%8.2f $EB - $EC
60. end

. prog def rangeSC
  1.   di "     T1        T2        T3        R1        R2        R3        XB        XC
>      deltaX"
  2.
.   LSC 1954 1963 2001 1.0 2.1 1.0
  3.   qui gen SC_lo = SC
  4.   lab var SC_lo "SC (R=1 post-2000) low est."
  5.   LSC 1954 1963 2001 1.0 2.1 2.1
  6.   LSC 1954 1963 2001 1.0 2.4 1.0
  7.   LSC 1954 1963 2001 1.0 3.0 1.0
  8.   LSC 1954 1963 2001 1.0 3.6 1.0
  9.
.   LSC 1954 1963 2001 1.5 2.4 1.0
 10.
.   ******Wecker Change: change 3.0 to 1.0******
.
.   *LSC 1954 1963 2001 1.5 3.0 1.0
.    LSC 1954 1963 2001 1.5 1.0 1.0
 11.
.   **************End Wecker Change************
.
.   qui gen SC_ = SC
 12.   lab var SC_ "SC (R=1 post-2000) middle est."
 13.   LSC 1954 1963 2001 1.5 3.0 3.0
 14.   qui gen SC3 = SC
 15.   lab var SC3 "SC (R=3 post-2000) middle est."
 16.
.   LSC 1954 1963 2001 1.5 3.6 1.0
 17.   LSC 1954 1963 2001 2.0 2.4 1.0
 18.   LSC 1954 1963 2001 2.0 3.0 1.0
 19.   LSC 1954 1963 2001 2.0 3.6 1.0
 20.   LSC 1954 1963 2001 2.0 3.9 1.0
 21.   qui gen SC_hi = SC
 22.   lab var SC_hi "SC (R=1 post-2000) high est."
 23.   LSC 1954 1963 2001 2.0 3.9 3.9
 24.
.   LSC 1954 1963 1999 1.5 3.0 1.0
 25.   LSC 1954 1963 2000 1.5 3.0 1.0
 26.
.
. end
.
```

remove asbestos-specific quit rate effect

(past)

```
. rangeSC
```

T1	T2	T3	R1	R2	R3	XB	XC	deltaX
1954	1963	2001	1.0	2.1	1.0	45.43	37.02	8.41
1954	1963	2001	1.0	2.1	2.1	45.43	36.18	9.25
1954	1963	2001	1.0	2.4	1.0	45.43	35.49	9.94
1954	1963	2001	1.0	3.0	1.0	45.43	33.02	12.41
1954	1963	2001	1.0	3.6	1.0	45.43	31.13	14.30
1954	1963	2001	1.5	2.4	1.0	45.43	34.94	10.49
1954	1963	2001	1.5	1.0	1.0	45.43	44.61	0.81
1954	1963	2001	1.5	3.0	3.0	45.43	31.75	13.67
1954	1963	2001	1.5	3.6	1.0	45.43	30.69	14.74
1954	1963	2001	2.0	2.4	1.0	45.43	34.42	11.01
1954	1963	2001	2.0	3.0	1.0	45.43	32.07	13.36
1954	1963	2001	2.0	3.6	1.0	45.43	30.27	15.16
1954	1963	2001	2.0	3.9	1.0	45.43	29.52	15.91
1954	1963	2001	2.0	3.9	3.9	45.43	28.91	16.51
1954	1963	1999	1.5	3.0	1.0	45.43	32.75	12.68
1954	1963	2000	1.5	3.0	1.0	45.43	32.64	12.79

```
. gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1
> ("Proportion Still Alive and Smoking")saving(nqr8a,replace)
(Note: file nqr8a.gph not found)

. gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(
> JJJ)l1("Proportion Still Alive and Smoking")saving(nqr8b,replace)
(Note: file nqr8b.gph not found)

.
. form LSB SC* %7.3f

. form x %6.0f

. keep x LSB SC_*

. l, nod
```

	x	LSB	SC_lo	SC_	SC_hi
1.	17	1.000	1.000	1.000	1.000
2.	18	1.000	1.000	1.000	1.000
3.	19	0.999	0.998	0.998	0.998
4.	20	0.994	0.993	0.993	0.990
5.	21	0.990	0.988	0.989	0.984
6.	22	0.977	0.973	0.975	0.961
7.	23	0.973	0.968	0.971	0.955
8.	24	0.967	0.960	0.964	0.943
9.	25	0.963	0.955	0.959	0.935
10.	26	0.959	0.950	0.954	0.927
11.	27	0.954	0.944	0.949	0.918
12.	28	0.951	0.940	0.946	0.912
13.	29	0.946	0.933	0.940	0.901
14.	30	0.939	0.923	0.932	0.885
15.	31	0.934	0.916	0.926	0.873
16.	32	0.925	0.903	0.915	0.852
17.	33	0.922	0.898	0.911	0.844
18.	34	0.910	0.881	0.898	0.816
19.	35	0.900	0.865	0.886	0.790
20.	36	0.895	0.858	0.881	0.778
21.	37	0.891	0.851	0.876	0.767
22.	38	0.883	0.838	0.868	0.747
23.	39	0.873	0.821	0.856	0.718
24.	40	0.859	0.798	0.842	0.683
25.	41	0.852	0.786	0.834	0.664
26.	42	0.835	0.758	0.816	0.622
27.	43	0.822	0.735	0.802	0.588

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nqr8.log

28.	44	0.810	0.715	0.790	0.559
29.	45	0.791	0.682	0.771	0.513
30.	46	0.776	0.657	0.755	0.480
31.	47	0.760	0.631	0.739	0.445
32.	48	0.742	0.601	0.721	[illegible]
33.	49	0.730	0.582	0.709	[illegible]
34.	50	0.706	0.545	0.685	0.341
35.	51	0.695	0.529	0.675	0.323
36.	52	0.678	0.505	0.659	0.297
37.	53	0.659	0.478	0.640	0.270
38.	54	0.642	0.453	0.623	0.245
39.	55	0.618	0.422	0.600	0.216
40.	56	0.596	0.394	0.578	0.192
41.	57	0.573	0.366	0.556	0.168
42.	58	0.559	0.349	0.542	0.155
43.	59	0.536	0.324	0.520	0.137
44.	60	0.510	0.297	0.495	0.118
45.	61	0.492	0.279	0.478	0.107
46.	62	0.473	0.261	0.459	0.096
47.	63	0.448	0.238	0.434	0.083
48.	64	0.428	0.221	0.416	0.074
49.	65	0.411	0.207	0.399	0.067
50.	66	0.390	0.191	0.378	0.060
51.	67	0.374	0.179	0.363	0.055
52.	68	0.355	0.166	0.345	0.049
53.	69	0.335	0.152	0.325	0.044
54.	70	0.316	0.141	0.307	0.040
55.	71	0.299	0.130	0.290	0.036
56.	72	0.285	0.122	0.276	0.034
57.	73	0.273	0.116	0.265	0.032
58.	74	0.260	0.109	0.252	0.030
59.	75	0.250	0.104	0.242	0.028
60.	76	0.236	0.097	0.229	0.026
61.	77	0.222	0.091	0.216	0.024
62.	78	0.213	0.087	0.207	0.023
63.	79	0.203	0.083	0.197	0.022
64.	80	0.191	0.078	0.186	0.021
65.	81	0.176	0.071	0.171	0.019
66.	82	0.167	0.068	0.162	0.018
67.	83	0.161	0.065	0.157	0.017
68.	84	0.159	0.065	0.155	0.017
69.	85	0.158	0.064	0.153	0.017
70.	86	0.157	0.063	0.152	0.017
71.	87	0.149	0.060	0.145	0.016
72.	88	0.141	0.057	0.137	0.015
73.	89	0.127	0.051	0.123	0.014
74.	90	0.126	0.051	0.123	0.014
75.	91	0.126	0.051	0.123	0.014
76.	92	0.126	0.051	0.123	0.014
77.	93	0.126	0.051	0.123	0.014
78.	94	0.117	0.047	0.113	0.013
79.	95	0.117	0.047	0.113	0.013
80.	96	0.117	0.047	0.113	0.013
81.	97	0.117	0.047	0.113	0.013
82.	98	0.117	0.047	0.113	0.013

```
. save nqr8_R2, replace
(Note: file nqr8_R2.dta not found)
file nqr8_R2.dta saved

.
.
. log close
```

ndx4_R2.do

```
* @RM500
* ndx4:  Combines output of nqr8 (quit-rate effect) and nir6 (initiation-rate) effect
* to estimate delta X (change in mean lifetime years of smoking) for past claimants
* Produces low, med, and high estimates for CR scenario without post-2000 misconduct

clear
prog drop _all
set matsize 500
set rmsg off
set more off


log using ndx4, replace
* Future claimants: Effects of decreased initiation
use nir6
* Compute frequency distributions
prog def Freq
 qui gen f$_1 = F$_1 - F$_1[_n-1]
end

Freq B
Freq C_lo
Freq C_
Freq C_hi
drop F*
drop in 1
form f* %7.3f
form x %6.0f

* Combine with results on Past Claimants: Effect of Increase Quit Rates
merge x using nqr8_R2
ren LSB SB
* Reverse sort order to compute conditional means
gen byte n = _N - _n
sort n
drop n

* Compute conditional means
prog def CondMean
 qui replace S$_1 = S$_1[_n-1] if S$_1 == .
 qui gen m$_1 = sum(S$_1)
 qui replace m$_1 = m$_1/S$_1
end

CondMean B
CondMean C_lo
CondMean C_
CondMean C_hi
keep x f* m*
form m* %7.3f
sort x
drop if fB == .

* Compute Mean Years Smoked (X)
prog def mX
 qui gen s$_1 = f$_1 * m$_1
 qui sum s$_1
 global X$_1 = r(mean)*r(N)
 drop s$_1
end

mX B
mX C_lo
mX C_
mX C_hi

* Baseline scenario: Mean Years Smoked
di %9.1f $XB
prog def Results
di "----    Decrease in mean years smoked    ----"
di "Post-2000        Low        Middle        High"
di "Misconduct       Est.       Est.          Est."
dx"  No      ",%12.1f $XB - $XC_lo,%12.1f $XB - $XC_,%12.1f $XB - $XC_hi
end
Results

* Convert results to matrix & save
*matrix def dX = J(2,3,0)
matrix def dX = J(1,3,0)
matrix dX[1,1] = $XB - $XC_lo
matrix dX[1,2] = $XB - $XC_
matrix dX[1,3] = $XB - $XC_hi
drop _all
svmat dX
gen byte Scenario = _n
lab def Scenario 1"No Post2000" 2"Post2000"
lab val Scenario Scenario
ren dX1 dX_lo
ren dX2 dX
ren dX3 dX_hi
gen byte Era = 1
lab def Era 1"Past" 2"Future"
lab val Era Era
order Era Scenario dX_lo dX dX_hi
form dX* %9.2f
save ndx4_R2, replace
1
log close

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```


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ndx4.log

```
. * Future claimants: Effects of decreased initiation
. use nir6

. * Compute frequency distributions
. prog def Freq
  1.  qui gen f$_1 = F$_1 - F$_1[_n-1]
  2.  end

.
. Freq B

. Freq C_lo

. Freq C_

. Freq C_hi

. drop F*

. drop in 1
(1 observation deleted)

. form f* %7.3f

. form x %6.0f

.
. * Combine with results on Past Claimants: Effect of Increase Quit Rates
. merge x using nqr4_R2

. ren LSB SB

. * Reverse sort order to compute conditional means
. gen byte n = _N - _n

. sort n

. drop n

.
. * Compute conditional means
. prog def CondMean
  1.  qui replace S$_1 = S$_1[_n-1] if S$_1 == .
  2.  qui gen m$_1 = sum(S$_1)
  3.  qui replace m$_1 = m$_1/S$_1
  4.  end

.
. CondMean B

. CondMean C_lo

. CondMean C_

. CondMean C_hi

. keep x f* m*

. form m* %7.3f

. sort x

. drop if fB == .
(48 observations deleted)

.
. * Compute Mean Years Smoked (X)
. prog def mX
  1.  qui gen s$_1 = f$_1 * m$_1
  2.  qui sum s$_1
  3.  global X$_1 = r(mean)*r(N)
  4.  drop s$_1
  5.  end

. mX B

. mX C_lo

. mX C_

. mX C_hi

. * Baseline scenario: Mean Years Smoked
. di %4.1f $XB
  32.2

. prog def Results
  1.  di "---        Decrease in mean years smoked       ---"
  2.  di "Post-2000         Low         Middle         High"
  3.  di "Misconduct        Est.        Est.           Est."
  4.  di " No      ",%12.1f $XB - $XC_lo,%12.1f $XB - $XC_,%12.1f $XB - $XC_hi
  5.  end

. Results
---        Decrease in mean years smoked      ---
Post-2000         Low        Middle        High
Misconduct        Est.        Est.          Est.
 No               6.9         1.9          13.3

.
.
. * Convert results to matrix & save
. * matrix def dX = J(2,3,0)
. matrix def dX = J(1,3,0)

. matrix dX[1,1] = $XB - $XC_lo

. matrix dX[1,2] = $XB - $XC_

. matrix dX[1,3] = $XB - $XC_hi

. drop _all

. svmat dX
number of observations will be reset to 1
Press any key to continue, or Break to abort
obs was 0, now 1

. gen byte Scenario = _n

. lab def Scenario 1"No-Post2000" 2"Post2000"

. lab val Scenario Scenario

. ren dX1 dX_lo

. ren dX2 dX
```

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ndx4.log

```
. ren dX3 dX_hi

. gen byte Era = 1

. lab def Era 1"Past" 2"Future"

  lab val Era Era

. order Era Scenario dX_lo dX dX_hi

. form dX* %9.2f

. save ndx4_R2, replace
(Note: file ndx4_R2.dta not found)
file ndx4_R2.dta saved

. l

        Era    Scenario     dX_lo       dX     dX_hi
  1.   Past  No-Post2000     6.86     1.94     13[illegible]

. log close
```


(past)

c.f. Harris's reduction in mean smokyrs of 10.65

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Ms8a_R2.lim


```
/* LIMDEP 7.0 source code:
   Multivariate normal analysis of:
     1. cumulative incidence of Lung Cancer (diedLC);
     2. prevalence of parenchymal disease (by ILO profusion
        score on X-ray) (Par);
     3. abnormal pulmonary function by spirometric
        determination of FVC) (PFT); and
     4. Pleural injury (anyPleu)
   This 'main' version assumes that there no relationship between
   smoking and pleural injury.
   Exposure results based upon assumption of no misconduct post-2000.
 */

/* Restrict analysis to main sample (2,243) rather than
   extended sample (2,609) */
reject; new; w = 0 $
skip

/* RHS variables (including years smoked, age categories, and
   categories of post-latency asbestos exposure as 'X' */
namelist; X = one, smokYrs, ageG*, T10_* $

/* Separate namelist with years smoked dropped for pleural disease
   dose-response models only */
namelist; Xo = one, ageG*, T10_* $

/* Descriptive statistics (sample means) of RHS variables */
dstat; rhs = X $

/* Save sample mean values of X's (and constant) in X_BL,
   which corresponds to baseline scenario (BL) */
matrix; Xmeans = part(LastDsta, 1, 7, 1, 1) $
/* Append 1 to vector of sample means */
matrix; u = [1] $
matrix; X_BL = [u , Xmeans] $

/* Construct conformal vector for Xo_BL */
dstat; rhs = Xo $
matrix; Xomeans = part(LastDsta, 1, 6, 1, 1) $
matrix; Xo_BL = [u / Xomeans] $

/* Univariate models: Show marginal effects.
   Note: LIMDEP computes partial derivatives dF/dXi, while
   Stata by default shows discrete effects deltaF/deltaXi. */

probit; lhs = diedLC; rhs = X; marginal effects $
matrix; b_LC = B $

probit; lhs = Par; rhs = X; marginal effects $
matrix; b_Par = B $

probit; lhs = PFT; rhs = X; marginal effects $
matrix; b_PFT = B $

/* Note change in RHS for anyPleu */
probit; lhs = anyPleu; rhs = Xo; marginal effects $
matrix; b_Ple = B $

/* Pairwise Bivariate probit models */

bivariate; lhs = diedLC, Par; rh1 = X; rh2 = X;
        start = b_LC, b_Par; marginal effects $
matrix; b_LC = part(B, 1, 8) $
calc; rhoLCPar = rho $

bivariate; lhs = Par, PFT; rh1 = X; rh2 = X;
        start = b_Par, b_PFT; marginal effects $
matrix; b_Par = part(B, 1, 8); b_PFT = part(B, 9, 16) $
calc; rhoParPF = rho $

bivariate; lhs = diedLC, PFT; rh1 = X; rh2 = X;
        start = b_LC, b_PFT; marginal effects $
calc; rhoLCPFT = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = diedLC, anyPleu; rh1 = X; rh2 = Xo;
        start = b_LC, b_Ple; marginal effects $
calc; rhoLCPle = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = Par, anyPleu; rh1 = X; rh2 = Xo;
        start = b_Par, b_Ple; marginal effects $
/* Note change in dimension of b_Ple */
matrix; b_Ple = part(B, 9, 15) $
calc; rhoParPl = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = PFT, anyPleu; rh1 = X; rh2 = Xo;
        start = b_PFT, b_Ple; marginal effects $
calc; rhoPFTPl = rho $

/* 4x4 Variance-covariance matrix for multivariate
   normal calculations */
matrix; Omega4 = [1 /
                 rhoLCPar, 1/
                 rhoLCPFT, rhoParPF, 1/
                 rhoLCPle, rhoParPl, rhoPFTPl, 1] $

/* 3x3 Variance-covariance submatrix for multivariate
   normal calculations */
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $

/* Computation of indices XB at (baseline) means of X
   from probit models */
matrix; y_LC = X_BL'b_LC $
matrix; y_Par = X_BL'b_Par $
matrix; y_PFT = X_BL'b_PFT $
/* Note change in code for pleural */
matrix; y_Ple = Xo_BL'b_Ple $

/* Counterfactual values of indices (past) - no post-2000 misconduct */
matrix; y_LC_p   = y_LC - 1.94*Part(b_LC,2,2,1,1) $
matrix; y_LC_pHi = y_LC - 1.94*Part(b_LC,2,2,1,1) $
matrix; y_LC_pLo = y_LC - 1.94*Part(B_LC,2,2,1,1) $

matrix; y_Pa_p   = y_Par - 1.94*Part(b_Par,2,2,1,1) $
matrix; y_Pa_pHi = y_Par - 1.94*Part(b_Par,2,2,1,1) $
matrix; y_Pa_pLo = y_Par - 1.94*Part(b_Par,2,2,1,1) $

matrix; y_PF_p   = y_PFT - 1.94*Part(b_PFT,2,2,1,1) $
matrix; y_PF_pHi = y_PFT - 1.94*Part(b_PFT,2,2,1,1) $
matrix; y_PF_pLo = y_PFT - 1.94*Part(b_PFT,2,2,1,1) $

/* Note change in code for pleural disease */
matrix; y_Pl_p   = y_Ple $
matrix; y_Pl_pHi = y_Ple $
matrix; y_Pl_pLo = y_Ple $

/* Counterfactual values of indices (future) - no post-2000 misconduct */
```

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Ms8a_R2.lim

```
matrix; y_LC_f   = y_LC - 12.08*Part(b_LC,2,2,1,1) $
matrix; y_LC_fHi = y_LC - 12.08*Part(b_LC,2,2,1,1) $
matrix; y_LC_fLo = y_LC - 12.08*Part(b_LC,2,2,1,1) $

matrix; y_Pa_t   - y_Par - 12.08*Part(b_Par,2,2,1,1) $
matrix; y_Pa_tHi = y_Par - 12.08*Part(b_Par,2,2,1,1) $
matrix; y_Pa_tLo = y_Par - 12.08*Part(b_Par,2,2,1,1) $

matrix; y_PF_t   = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $
matrix; y_PF_fHi = y_PFT -12.08*Part(b_PFT,2,2,1,1) $
matrix; y_PF_fLo = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $

/* Note change in code for pleural disease */
matrix; y_Pl_f   = y_Ple  $
matrix; y_Pl_fHi = y_Ple  $
matrix; y_Pl_fLo = y_Ple  $

/* Probability of still getting LC (p11) */
calc; p_LC = phi(y_LC) $
calc; p11_p = phi(y_LC_p)/p_LC $
calc; p11_pLo = phi(y_LC_pLo)/p_LC $
calc; p11_pHi = phi(y_LC_pHi)/p_LC $
calc; p11_f = phi(y_LC_f)/p_LC $
calc; p11_fLo = phi(y_LC_fLo)/p_LC $
calc; p11_fHi = phi(y_LC_fHi)/p_LC $

/* Probability of not getting LC but instead getting
   Disabling BID (Par and PFT) (p21); as well as
   Probability of not getting LC but instead getting
   Non-disabling BID (Par and not PFT) (p31) */

/* Use Greene's sign convention matrix (page 229)*/
matrix; T = [1,0,0/0,1,0/0,0,-1] $
matrix; Omega3A = T*Omega3*T $

matrix; z0 = [y_LC   / y_Pa_p / y_PF_p ] $
matrix; z1 = [y_LC_p / y_Pa_p / y_PF_p ] $
calc; p21_p = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $


matrix; z0 = [y_LC   / y_Pa_pLo / y_PF_pLo ] $
matrix; z1 = [y_LC_pLo / y_Pa_pLo / y_PF_pLo ] $
calc; p21_pLo = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_pHi / y_PF_pHi ] $
matrix; z1 = [y_LC_pHi / y_Pa_pHi / y_PF_pHi ] $
calc; p21_pHi = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_f / y_PF_f ] $
matrix; z1 = [y_LC_f / y_Pa_f / y_PF_f ] $
calc; p21_f = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_fLo / y_PF_fLo ] $
matrix; z1 = [y_LC_fLo / y_Pa_fLo / y_PF_fLo ] $
calc; p21_fLo = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_fHi / y_PF_fHi ] $
matrix; z1 = [y_LC_fHi / y_Pa_fHi / y_PF_fHi ] $
calc; p21_fHi = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

/* Collect results in subdiagonal matrices and clean up.*/
matrix; P_p = Iden(4) $
matrix; P_pLo = Iden(4) $
matrix; P_pHi = Iden(4) $
matrix; P_f = Iden(4) $
matrix; P_fLo = Iden(4) $
matrix; P_fHi = Iden(4) $

matrix; P_p(1,1) = p11_p $
matrix; P_p(2,1) = p21_p $
matrix; P_p(3,1) = p31_p $
calc; delete p11_p, p21_p, p31_p $

matrix; P_pLo(1,1) = p11_pLo $
matrix; P_pLo(2,1) = p21_pLo $
matrix; P_pLo(3,1) = p31_pLo $
calc; delete p11_pLo, p21_pLo, p31_pLo $

matrix; P_pHi(1,1) = p11_pHi $
matrix; P_pHi(2,1) = p21_pHi $
matrix; P_pHi(3,1) = p31_pHi $
calc; delete p11_pHi, p21_pHi, p31_pHi $

matrix; P_f(1,1) = p11_f $
matrix; P_f(2,1) = p21_f $
matrix; P_f(3,1) = p31_f $
calc; delete p11_f, p21_f, p31_f $

matrix; P_fLo(1,1) = p11_fLo $
matrix; P_fLo(2,1) = p21_fLo $
matrix; P_fLo(3,1) = p31_fLo $
calc; delete p11_fLo, p21_fLo, p31_fLo $

matrix; P_fHi(1,1) = p11_fHi $
matrix; P_fHi(2,1) = p21_fHi $
matrix; P_fHi(3,1) = p31_fHi $
calc; delete p11_fHi, p21_fHi, p31_fHi $


/* Probability of not getting LC but instead getting
   Pleural disease only (p41) */
/* Construct new 3x3 submatrix of Omega4 that gives only
   correlations of LC, Par, and Pl */

matrix; Omega3 = [1 /
                  rhoLCPar, 1/
                  rhoLCPle, rhoParPl, 1] $

/* As before, use Greene's sign convention matrix (page 229)*/
matrix; T = [1,0,0/0,-1,0/0,0,1] $
matrix; Omega3A = T*Omega3*T $
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```
matrix; z0 = [y_LC   / y_Pa_p / y_Pl_p] $
matrix; z1 = [y_LC_p / y_Pa_p / y_Pl_p] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pLo / y_Pl_pLo] $
matrix; z1 = [y_LC_pLo / y_Pa_pLo / y_Pl_pLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pHi / y_Pl_pHi] $
matrix; z1 = [y_LC_pHi / y_Pa_pHi / y_Pl_pHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_f / y_Pl_f] $
matrix; z1 = [y_LC_f / y_Pa_f / y_Pl_f] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fLo / y_Pl_fLo] $
matrix; z1 = [y_LC_fLo / y_Pa_fLo / y_Pl_fLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fHi / y_Pl_fHi] $
matrix; z1 = [y_LC_fHi / y_Pa_fHi / y_Pl_fHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

/* Collect results and clean up. */
matrix; P_p(4,1) = p41_p $
matrix; P_pLo(4,1) = p41_pLo $
matrix; P_pHi(4,1) = p41_pHi $
matrix; P_f(4,1) = p41_f $
matrix; P_fLo(4,1) = p41_fLo $
matrix; P_fHi(4,1) = p41_fHi $
calc; delete p41_p, p41_pLo, p41_pHi $
calc; delete p41_f, p41_fLo, p41_fHi $

/* Probability of Not Getting DBID but getting Non-Disabling
   BID in CF (no LC, Par but No PTF) */
/* Use original omega3 submatrix */
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $
/* Sign matrix on order restrictions */
matrix; T = [-1,0,0/0,1,0/0,0,1] $
matrix; Omega3A = T*Omega3*T $
matrix; z = [y_LC  / y_Par / y_PFT ] $
matrix; zA = T*z $
/* Probability of DBID and not LC in BL */
calc; p_DBID = Mvn(zA, Omega3A) $

/* Probability of still getting DBID in CF */
/* Probability of getting only NBID but not DBID in CF */

matrix; z1 = [y_LC / y_Pa_p / y_PF_p ] $
matrix; z1A = T*z1 $
calc; p22_p = Mvn(z1A,Omega3A)/p_DBID $

matrix; z0 = [y_LC / y_Pa_p / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_pLo / y_PF_pLo ] $
matrix; z1A = T*z1 $
calc; p22_pLo = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_pLo / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_pHi / y_PF_pHi ] $
matrix; z1A = T*z1 $
calc; p22_pHi = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_pHi / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_f / y_PF_f ] $
matrix; z1A = T*z1 $
calc; p22_f = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_f / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_fLo / y_PF_fLo ] $
matrix; z1A = T*z1 $
calc; p22_fLo = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_fLo / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_fHi / y_PF_fHi ] $
matrix; z1A = T*z1 $
calc; p22_fHi = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_fHi / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

/* Collect results and clean up. */
matrix; P_p(2,2) = p22_p $
matrix; P_pLo(2,2) = p22_pLo $
matrix; P_pHi(2,2) = p22_pHi $
matrix; P_f(2,2) = p22_f $
matrix; P_fLo(2,2) = p22_fLo $
matrix; P_fHi(2,2) = p22_fHi $
calc; delete p22_p, p22_pLo, p22_pHi $
calc; delete p22_f, p22_fLo, p22_fHi $

matrix; P_p(3,2) = p32_p $
matrix; P_pLo(3,2) = p32_pLo $
matrix; P_pHi(3,2) = p32_pHi $
matrix; P_f(3,2) = p32_f $
matrix; P_fLo(3,2) = p32_fLo $
matrix; P_fHi(3,2) = p32_fHi $
calc; delete p32_p, p32_pLo, p32_pHi $
calc; delete p32_f, p32_fLo, p32_fHi $

/* Probability of getting only pleural in CF given
DBID in BL */

/* Use Omega4 matrix */
matrix; T = [-1,0,0,0/ 0,1,0,0/ 0,0,1,0/ 0,0,0,1] $
matrix; Omega4A = T*Omega4*T $
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```
matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_p] $
matrix; z1 = [y_LC/ y_Pa_p/ y_PFT/ y_Pl_p] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_p = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_pLo] $
matrix; z1 = [y_LC/ y_Pa_pLo/ y_PFT/ y_Pl_pLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_pLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_pHi] $
matrix; z1 = [y_LC/ y_Pa_pHi/ y_PFT/ y_Pl_pHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_pHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_f] $
matrix; z1 = [y_LC/ y_Pa_f/ y_PFT/ y_Pl_f] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_f = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_fLo] $
matrix; z1 = [y_LC/ y_Pa_fLo/ y_PFT/ y_Pl_fLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_fLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_fHi] $
matrix; z1 = [y_LC/ y_Pa_fHi/ y_PFT/ y_Pl_fHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_fHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

/* Collect results and clean up. */
matrix; P_p(4,2) = p42_p $
matrix; P_pLo(4,2) = p42_pLo $
matrix; P_pHi(4,2) = p42_pHi $
matrix; P_f(4,2) = p42_f $
matrix; P_fLo(4,2) = p42_fLo $
matrix; P_fHi(4,2) = p42_fHi $
calc; delete p42_p, p42_pLo, p42_pHi $
calc; delete p42_f, p42_fLo, p42_fHi $

/* Probability of NBID in BL */
matrix; T = [-1,0,0/ 0,1,0/ 0,0,-1] $
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $
matrix; Omega3A = T*Omega3*T $

matrix; z = [y_LC / y_Par / y_PFT] $
matrix; zA = T*z $
calc; p_NBID = Mvn(zA,Omega3A) $

/* Probability of NBID in BL and NBID in CF */

matrix; z0 = [y_LC / y_Pa_p / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_p = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_pLo / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_pLo = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_pHi / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_pHi = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_f / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_f = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_fLo / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_fLo = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_fHi / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_fHi = Mvn(z0A,Omega3A)/p_NBID $

/* Collect results and clean up */
matrix; P_p(3,3) = p33_p $
matrix; P_pLo(3,3) = p33_pLo $
matrix; P_pHi(3,3) = p33_pHi $
matrix; P_f(3,3) = p33_f $
matrix; P_fLo(3,3) = p33_fLo $
matrix; P_fHi(3,3) = p33_fHi $
calc; delete p33_p, p33_pLo, p33_pHi $
calc; delete p33_f, p33_fLo, p33_fHi $

/* Probability of Pl but not NBID in CF given NBID in BL */
/* Use Omega4 matrix */
matrix; T = [-1,0,0,0/ 0,1,0,0/ 0,0,-1,0/ 0,0,0,1] $
matrix; Omega4A = T*Omega4*T $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_p ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_p / y_PFT / y_Pl_p ] $
matrix; z1A = T*z1 $
calc; p43_p = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_pLo ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_pLo / y_PFT / y_Pl_pLo ] $
matrix; z1A = T*z1 $
calc; p43_pLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_pHi ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_pHi / y_PFT / y_Pl_pHi ] $
matrix; z1A = T*z1 $
calc; p43_pHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_f ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_f / y_PFT / y_Pl_f ] $
matrix; z1A = T*z1 $
calc; p43_f = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_fLo ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_fLo / y_PFT / y_Pl_fLo ] $
matrix; z1A = T*z1 $
calc; p43_fLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_fHi ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_fHi / y_PFT / y_Pl_fHi ] $
```

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```
matrix; z1A = T*z1 $
calc; p43_fHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

 * Collect results and clean up. */
matrix; P_p(4,3) = p43_p $
matrix; P_pLo(4,3) = p43_pLo $
matrix; P_pHi(4,3) = p43_pHi $
matrix; P_f(4,3) = p43_f $
matrix; P_fLo(4,3) = p43_fLo $
matrix; P_fHi(4,3) = p43_fHi $
calc; delete p43_p, p43_pLo, p43_pHi $
calc; delete p43_f, p43_fLo, p43_fHi $

/* Probability of pleural injury in BL */
/* Recreate 3x3 submatrix of Omega4 that gives only
   correlations of LC, Par, and Pl */
matrix; Omega3 = [1 /
                  rhoLCPar, 1/
                  rhoLCPle, rhoParPl, 1] $
matrix; T = [-1,0,0/ 0,-1,0/ 0,0,1] $
matrix; Omega3A = T*Omega3*T $
matrix; z0 = [y_LC / y_Par / y_Ple ] $
matrix; z0A = T*z0 $
calc; p_Pl = Mvn(z0A, Omega3A) $

 * Probability of Pl in CF given Pl in BL */
matrix; z1 = [y_LC / y_Par / y_Pl_p] $
matrix; z1A = T*z1 $
calc; p44_p = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_pLo] $
matrix; z1A = T*z1 $
calc; p44_pLo = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_pHi] $
matrix; z1A = T*z1 $
calc; p44_pHi = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_f] $
matrix; z1A = T*z1 $
calc; p44_f = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_fLo] $
matrix; z1A = T*z1 $
calc; p44_fLo = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_fHi] $
matrix; z1A = T*z1 $
calc; p44_fHi = Mvn(z1A,Omega3A)/p_Pl $

 * Collect results and clean up. */
matrix; P_p(4,4) = p44_p $
matrix; P_pLo(4,4) = p44_pLo $
matrix; P_pHi(4,4) = p44_pHi $
matrix; P_f(4,4) = p44_f $
matrix; P_fLo(4,4) = p44_fLo $
matrix; P_fHi(4,4) = p44_fHi $
calc; delete p44_p, p44_pLo, p44_pHi $
calc; delete p44_f, p44_fLo, p44_fHi $
```

tab 73, p. 1

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Dm5_ms8a_R2.do

```
* @RM500
* DM5:  Computation of present discounted value (PDV)
* of 'past' non-FDD resolved and unresolved claims.
* Input files:  lv6; "Risk Free Interest Rate" ms7a
* This version is used ms7a as input file: No effect of smoking on pleural
* Program modifies DM3
clear
prog drop _all
set rmsg off
set more off
set matsize 500


log using dm5_ms8a, replace

* (0) Liquidated value of unresolved claims (based on TDP)
* from [MatrixREV95.xls]Unresolved:
matrix U = (88400, 25400, 51500, 12500)
matrix colnames U = LC NBID DBID Pl
matrix rownames U = LiqVal

* Administrative costs per claim from [MatrixREV95.xls]admin_costs
matrix C = (577 \ 210 )
matrix rownames C = past unres
matrix colnames C = ad_cost
matrix li C


* (1) Compute discount factors
use Risk Free Interest Rate
* Drop 1988-1991 (Courts' Preliminary Orders cover only 1992+)
drop in 1/4
qui gen n = 2000 - _n
sort n
gen dFactor = 1 in 1
qui replace dF = dF[_n-1]*(1 + I/100) in 2/9
form dF %9.3f
sort y
drop n I
l

* (2) Merge with lv6; incl. admin costs and unresolved claims
merge year using lv6
drop _m

* Estimated Liquidated Values of Unresolved Claims
qui replace VR_LC = U[1,1] if y == 2000
qui replace VS_LC = U[1,1] if y == 2000
qui replace VR_NBID = U[1,2] if y == 2000
qui replace VS_NBID = U[1,2] if y == 2000
qui replace VR_DBID = U[1,3] if y == 2000
qui replace VS_DBID = U[1,3] if y == 2000
qui replace VR_Pl = U[1,4] if y == 2000
qui replace VS_Pl = U[1,4] if y == 2000

* Add admin costs of past resolved claims to LiqVals
qui replace VR_LC = VR_LC + C[1,1] if y < 2000
qui replace VR_NBID = VR_NBID + C[1,1] if y < 2000
qui replace VR_DBID = VR_DBID + C[1,1] if y < 2000
qui replace VR_Pl = VR_Pl + C[1,1] if y < 2000
qui replace VS_LC = VS_LC + C[1,1] if y < 2000
qui replace VS_NBID = VS_NBID + C[1,1] if y < 2000
qui replace VS_DBID = VS_DBID + C[1,1] if y < 2000
qui replace VS_Pl = VS_Pl + C[1,1] if y < 2000

* Add admin costs to unresolved claims to LiqVals
qui replace VR_LC = VR_LC + C[2,1] if y == 2000
qui replace VR_NBID = VR_NBID + C[2,1] if y == 2000
qui replace VR_DBID = VR_DBID + C[2,1] if y == 2000
qui replace VR_Pl = VR_Pl + C[2,1] if y == 2000
qui replace VS_LC = VS_LC + C[2,1] if y == 2000
qui replace VS_NBID = VS_NBID + C[2,1] if y == 2000
qui replace VS_DBID = VS_DBID + C[2,1] if y == 2000
qui replace VS_Pl = VS_Pl + C[2,1] if y == 2000

* (3) Compute PDV of Liq Val + Admin Costs by Dx and Year
qui replace VR_LC = VR_LC * dF
qui replace VR_NBID = VR_NBID * dF
qui replace VR_DBID = VR_DBID * dF
qui replace VR_Pl = VR_Pl * dF
qui replace VS_LC = VS_LC * dF
qui replace VS_NBID = VS_NBID * dF
qui replace VS_DBID = VS_DBID * dF
qui replace VS_Pl = VS_Pl * dF
drop dF

* (4) Convert to matrices (Note: Order needs to be conformal with
*     order of rows in subdiagonal P-matrices in ms7a and ms7)
* RICO
  qui replace YR_LC = 0 if YR_LC == .
  qui replace YR_NBID = 0 if YR_NBID == .
  qui replace YR_DBID = 0 if YR_DBID == .
  qui replace YR_Pl = 0 if YR_Pl == .
  mkmat YR_LC
  mkmat YR_NBID
  mkmat YR_DBID
  mkmat YR_Pl
  matrix YR = YR_LC, YR_DBID, YR_NBID, YR_Pl
  matrix drop YR_LC YR_NBID YR_DBID YR_Pl
  matrix colnames YR = LC DBID NBID Pl
  matrix rownames YR = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li YR, format(%8.0f) title("RICO Claims by Dx Year")

  qui replace VR_LC = 0 if VR_LC == .
  qui replace VR_NBID = 0 if VR_NBID == .
  qui replace VR_DBID = 0 if VR_DBID == .
  qui replace VR_Pl = 0 if VR_Pl == .
  mkmat VR_LC
  mkmat VR_NBID
  mkmat VR_DBID
  mkmat VR_Pl
  matrix VR = VR_LC, VR_DBID, VR_NBID, VR_Pl
  matrix drop VR_LC VR_NBID VR_DBID VR_Pl
  matrix colnames VR = LC DBID NBID Pl
  matrix rownames VR = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li VR, format(%8.0f) title("RICO PDV LiqVal+AdmCost by Dx Year")

* SFA
  qui replace YS_LC = 0 if YS_LC == .
  qui replace YS_NBID = 0 if YS_NBID == .
  qui replace YS_DBID = 0 if YS_DBID == .
  qui replace YS_Pl = 0 if YS_Pl == .
  mkmat YS_LC
  mkmat YS_NBID
  mkmat YS_DBID
  mkmat YS_Pl
  matrix YS = YS_LC, YS_DBID, YS_NBID, YS_Pl
  matrix drop YS_LC YS_NBID YS_DBID YS_Pl
  matrix colnames YS = LC DBID NBID Pl
```


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Dm5_ms8a_R2.do

```
  matrix rownames YS = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li YS, format(%8.0f) title("SFA Claims by Dx Year")

  qui replace VS_LC = 0 if VS_LC == .
  qui replace VS_NBID = 0 if VS_NBID == .
  qui replace VS_DBID = 0 if VS_DBID == .
  qui replace VS_P1 = 0 if VS_P1 == .
  mkmat VS_LC
  mkmat VS_DBID
  mkmat VS_NBID
  mkmat VS_P1
  matrix VS = VS_LC, VS_DBID, VS_NBID, VS_P1
  matrix drop VS_LC VS_NBID VS_DBID VS_P1
  matrix colnames VS = LC DBID NBID P1
  matrix rownames VS = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li VS, format(%8.0f) title("SFA PDV LiqVal+AdmCost by Dx Year")

* (4) Get P-matrix from ms7a
* Note: This file has a slightly format than crl (as used in dm4)
drop _all
use ms8a_R2
* Use only 'past' estimates of P-matrix
keep if Era == 0
l,nod
* Loop through (low,med,high) (n = 1,2,3)
qui gen double PDV_RICO = .
qui gen double PDV_SFA = .
form PDV* %9.1f
matrix P = J(4,4,0)
prog def getPDV
  global n = 1
  while $n <= 3 {
    matrix P[1,1] = p11[$n]
    matrix P[2,1] = p21[$n]
    matrix P[2,2] = p22[$n]
    matrix P[3,1] = p31[$n]
    matrix P[3,2] = p32[$n]
    matrix P[3,3] = p33[$n]
    matrix P[4,1] = p41[$n]
    matrix P[4,2] = p42[$n]
    matrix P[4,3] = p43[$n]
    matrix P[4,4] = p44[$n]
di "case: ", $n
matrix li P
* Compute PDV for both RICO & SFA
    matrix DR = trace(VR * (I(4) - P) * YR')
    qui replace PDV_RICO = DR[1,1]/1e6 in $n
    matrix DS = trace(VS * (I(4) - P) * YS')
    qui replace PDV_SFA = DS[1,1]/1e6 in $n

* Save results in median case (n=2) for graphs and tables
    if $n == 2 {
* FR and FS are annual financial injury from RICO and SFA
      matrix FR = vecdiag(VR * (I(4) - P) * YR')
      matrix FS = vecdiag(VS * (I(4) - P) * YS')
      matrix FR = FR'
      matrix FS = FS'
* ZR and ZS are annual claims by Dx in counterfactual scenario (median case)
      matrix ZR = P * YR'
      matrix ZS = P * YS'
      matrix ZR = ZR'
      matrix ZS = ZS'
    }

    global n = $n + 1
    }
end
getPDV
l Era Range PDV_R PDV_S,nod

* Display results for median case for graphs and tables
drop _all
* Financial injury by year
svmat FR
svmat FS
qui replace FR = FR/1e6
qui replace FS = FS/1e6
gen int year = _n + 1991
svmat ZR
ren ZR1 ZR_LC
ren ZR2 ZR_DBID
ren ZR3 ZR_NBID
ren ZR4 ZR_P1
svmat ZS
ren ZS1 ZS_LC
ren ZS2 ZS_DBID
ren ZS3 ZS_NBID
ren ZS4 ZS_P1
order y FR FS ZR* ZS*
form F* Z* %8.0f
l y F*,nod
l y Z*,nod

save Claims_P,replace

log close
\032
```


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dm5_ms8a.log


```
. * (0) Liquidated value of unresolved claims (based on TDP)
. * from [MatrixREV95.xls]Unresolved:
. matrix U = (88400, 25400, 51500, 12500)

. matrix colnames U = LC NBID DBID Pl

. matrix rownames U = LiqVal

. * Administrative costs per claim from [MatrixREV95.xls]admin_costs
. matrix C = (577 \ 210 )

. matrix rownames C = past unres

. matrix colnames C = ad_cost

. matrix li C

C[2,1]
        ad_cost
 past       577
unres       210


. * (1) Compute discount factors
. use Risk Free Interest Rate

. * Drop 1988-1991 (Courts' Preliminary Orders cover only 1992+)
. drop in 1/4
(4 observations deleted)

. qui gen n = 2000 - _n

. sort n

. gen dFactor = 1 in 1
(8 missing values generated)

. qui replace dF = dF[_n-1]*(1 + I/100) in 2/9

. form dF %9.3f

. sort y

. drop n I

. l

        year    dFactor
  1.    1992      1.418
  2.    1993      1.370
  3.    1994      1.331
  4.    1995      1.281
  5.    1996      1.213
  6.    1997      1.153
  7.    1998      1.096
  8.    1999      1.045
  9.    2000      1.000

.
. * (2) Merge with lv6; incl. admin costs and unresolved claims
. merge year using lv6

. drop _m

. * Estimated Liquidated Values of Unresolved Claims
. qui replace VR_LC = U[1,1] if y == 2000

. qui replace VS_LC = U[1,1] if y == 2000

. qui replace VR_NBID = U[1,2] if y == 2000

. qui replace VS_NBID = U[1,2] if y == 2000

. qui replace VR_DBID = U[1,3] if y == 2000

. qui replace VS_DBID = U[1,3] if y == 2000

. qui replace VR_Pl = U[1,4] if y == 2000

. qui replace VS_Pl = U[1,4] if y == 2000

.
. * Add admin costs of past resolved claims to LiqVals
. qui replace VR_LC = VR_LC + C[1,1] if y < 2000

. qui replace VR_NBID = VR_NBID + C[1,1] if y < 2000

. qui replace VR_DBID = VR_DBID + C[1,1] if y < 2000

. qui replace VR_Pl = VR_Pl + C[1,1] if y < 2000

. qui replace VS_LC = VS_LC + C[1,1] if y < 2000

. qui replace VS_NBID = VS_NBID + C[1,1] if y < 2000

. qui replace VS_DBID = VS_DBID + C[1,1] if y < 2000

. qui replace VS_Pl = VS_Pl + C[1,1] if y < 2000

.
. * Add admin costs to unresolved claims to LiqVals
. qui replace VR_LC = VR_LC + C[2,1] if y == 2000

. qui replace VR_NBID = VR_NBID + C[2,1] if y == 2000

. qui replace VR_DBID = VR_DBID + C[2,1] if y == 2000

. qui replace VR_Pl = VR_Pl + C[2,1] if y == 2000

. qui replace VS_LC = VS_LC + C[2,1] if y == 2000

. qui replace VS_NBID = VS_NBID + C[2,1] if y == 2000

. qui replace VS_DBID = VS_DBID + C[2,1] if y == 2000

. qui replace VS_Pl = VS_Pl + C[2,1] if y == 2000

.
. * (3) Compute PDV of Liq Val + Admin Costs by Dx and Year
. qui replace VR_LC = VR_LC * dF

. qui replace VR_NBID = VR_NBID * dF

. qui replace VR_DBID = VR_DBID * dF
```

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dm5_ms8a.log

```
. qui replace VR_Pl = VR_Pl * dF

. qui replace VS_LC = VS_LC * dF

. qui replace VS_NBID = VS_NBID * dF

. qui replace VS_DBID = VS_DBID * dF

. qui replace VS_Pl = VS_Pl * dF

. drop dF


. * (4) Convert to matrices (Note: Order needs to be conformal with
. *     order of rows in subdiagonal P-matrices in ms7a and ms7)
. * RICO
.   qui replace YR_LC = 0 if YR_LC == .

.   qui replace YR_NBID = 0 if YR_NBID == .

.   qui replace YR_DBID = 0 if YR_DBID == .

.   qui replace YR_Pl = 0 if YR_Pl == .

.   mkmat YR_LC

.   mkmat YR_NBID

.   mkmat YR_DBID

.   mkmat YR_Pl

.   matrix YR = YR_LC, YR_DBID, YR_NBID, YR_Pl

.   matrix drop YR_LC YR_NBID YR_DBID YR_Pl

.   matrix colnames YR = LC DBID NBID Pl

.   matrix rownames YR = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li YR, format(%8.0f) title("RICO Claims by Dx Year")

YR[9,4]:  RICO Claims by Dx Year
          LC    DBID    NBID      Pl
1992       0       0       0       0
1993       0       0       0       0
1994       0       0       0       0
1995       0       0       0       0
1996     460      18      50      41
1997     852     601    1165    1024
1998    1408    2386    3823    3811
1999    2265   16423   24116    8291
2000    2960   15359   24575   10674

.
.   qui replace VR_LC = 0 if VR_LC == .

.   qui replace VR_NBID = 0 if VR_NBID == .

.   qui replace VR_DBID = 0 if VR_DBID == .

.   qui replace VR_Pl = 0 if VR_Pl == .

.   mkmat VR_LC

.   mkmat VR_NBID

.   mkmat VR_DBID

.   mkmat VR_Pl

.   matrix VR = VR_LC, VR_DBID, VR_NBID, VR_Pl

.   matrix drop VR_LC VR_NBID VR_DBID VR_Pl

.   matrix colnames VR = LC DBID NBID Pl

.   matrix rownames VR = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li VR, format(%8.0f) title("RICO PDV LiqVal+AdmCost by Dx Year")

VR[9,4]:  RICO PDV LiqVal+AdmCost by Dx Year
          LC    DBID    NBID      Pl
1992       0       0       0       0
1993       0       0       0       0
1994       0       0       0       0
1995       0       0       0       0
1996  106213   61370   31035   15261
1997  101419   58751   29730   14549
1998   96865   55924   28138   13853
1999   92414   52990   26774   12980
2000   88610   51710   25610   12710

.
. * SFA
.   qui replace YS_LC = 0 if YS_LC == .

.   qui replace YS_NBID = 0 if YS_NBID == .

.   qui replace YS_DBID = 0 if YS_DBID == .

.   qui replace YS_Pl = 0 if YS_Pl == .

.   mkmat YS_LC

.   mkmat YS_NBID

.   mkmat YS_DBID

.   mkmat YS_Pl

.   matrix YS = YS_LC, YS_DBID, YS_NBID, YS_Pl

.   matrix drop YS_LC YS_NBID YS_DBID YS_Pl

.   matrix colnames YS = LC DBID NBID Pl

.   matrix rownames YS = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li YS, format(%8.0f) title("SFA Claims by Dx Year")

YS[9,4]:  SFA Claims by Dx Year
          LC    DBID    NBID      Pl
1992      14       1       0       0
1993      17       2       0       0
1994     555       6       3       0
1995     933      44      30      21
1996    1612    1003    3356    3722
1997    2405    4262    7262    5453
```

dm5_ms8a.log

```
1998    2111    3967    6992    5907
1999    2653   22284   35603   12023
2000    3585   20135   30318   13653

.   qui replace VS_LC = 0 if VS_LC == .

.   qui replace VS_NBID = 0 if VS_NBID == .

.   qui replace VS_DBID = 0 if VS_DBID == .

.   qui replace VS_P1 = 0 if VS_P1 == .

.   mkmat VS_LC

.   mkmat VS_DBID

.   mkmat VS_NBID

.   mkmat VS_P1

.   matrix VS = VS_LC, VS_DBID, VS_NBID, VS_P1

.   matrix drop VS_LC VS_NBID VS_DBID VS_P1

.   matrix colnames VS = LC DBID NBID P1

.   matrix rownames VS = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li VS, format(%8.0f) title("SFA PDV LiqVal+AdmCost by Dx Year")

VS[9,4]:  SFA PDV LiqVal+AdmCost by Dx Year
          LC     DBID     NBID       P1
1992  159788    71719      818      818
1993  131377    69287      790      790
1994  115516    72882    34051      768
1995  113591    69612    33136    16613
1996  106310    62012    31374    15464
1997  101889    59378    30011    14811
1998   97037    56279    28231    13909
1999   92715    52772    26779    12661
2000   88610    51710    25610    12710

.
. * (4) Get P-matrix from ms7a
. * Note: This file has a slightly format than cr1 (as used in dm3)
. drop _all

. use msBa_R2

. * Use only 'past' estimates of P-matrix
. keep if Era == 0
(3 observations deleted)

. l,nod

        Era      Range       p11       p21       p22       p31       p32
>       p33        p41       p42       p43       p44
  1.   Past         Lo    0.8880    0.0365    0.9577    0.0482    0.0217
>    0.9754     0.0195    0.0174    0.0160    1.0000
  2.   Past        Med    0.8880    0.0365    0.9577    0.0482    0.0217
>    0.9754     0.0195    0.0174    0.0160    1.0000
  3.   Past         Hi    0.8880    0.0365    0.9577    0.0482    0.0217
>    0.9754     0.0195    0.0174    0.0160    1.0000
```

```
. * Loop through (low,med,high) (n = 1,2,3)
. qui gen double PDV_RICO = .

. qui gen double PDV_SFA = .

. form PDV* %9.1f

. matrix P = J(4,4,0)

. prog def getPDV
  1.    global n = 1
  2.    while $n <= 3 {
  3.       matrix P[1,1] = p11[$n]
  4.       matrix P[2,1] = p21[$n]
  5.       matrix P[2,2] = p22[$n]
  6.       matrix P[3,1] = p31[$n]
  7.       matrix P[3,2] = p32[$n]
  8.       matrix P[3,3] = p33[$n]
  9.       matrix P[4,1] = p41[$n]
 10.       matrix P[4,2] = p42[$n]
 11.       matrix P[4,3] = p43[$n]
 12.       matrix P[4,4] = p44[$n]
 13. di "case: ", $n
 14. matrix li P
 15. * Compute PDV for both RICO & SFA
.     matrix DR = trace(VR * (I(4) - P) * YR')
 16.      qui replace PDV_RICO = DR[1,1]/1e6 in $n
 17.      matrix DS = trace(VS * (I(4) - P) * YS')
 18.      qui replace PDV_SFA = DS[1,1]/1e6 in $n
 19.
. * Save results in median case (n=2) for graphs and tables
.     if $n == 2 {
 20. * FR and FS are annual financial injury from RICO and SFA
.       matrix FR = vecdiag(VR * (I(4) - P) * YR')
 21.        matrix FS = vecdiag(VS * (I(4) - P) * YS')
 22.        matrix FR = FR'
 23.        matrix FS = FS'
 24. * ZR and ZS are annual claims by Dx in counterfactual scenario (median cas
> e)
.       matrix ZR = P * YR'
 25.        matrix ZS = P * YS'
 26.        matrix ZR = ZR'
 27.        matrix ZS = ZS'
 28.     }
 29.
.     global n = $n + 1
 30.   }
 31. end

. getPDV
case:  1

P[4,4]
            c1          c2          c3          c4
r1   .88800001           0           0           0
r2       .0365   .95770001           0           0
r3       .0482       .0217   .97539997           0
r4       .0195       .0174        .016           1
case:  2

P[4,4]
            c1          c2          c3          c4
r1   .88800001           0           0           0
r2       .0365   .95770001           0           0
r3       .0482       .0217   .97539997           0
```

dm5_ms8a.log

```
r4      .0195      .0174      .016         1
case:  3

P[4,4]
          c1          c2          c3
r1   .88800001         0           0           0
r2      .0365  .95770001           0           0
r3      .0482      .0217   .97539997           0
r4      .0195      .0174        .016           1

. l Era Range PDV_R PDV_S,nod

         Era     Range    PDV_RICO    PDV_SFA
  1.    Past        Lo      128.7      214.1
  2.    Past       Med      128.7      214.1
  3.    Past        Hi      128.7      214.1

.
.
. * Display results for median case for graphs and tables
. drop _all

. * Financial injury by year
. svmat FR
number of observations will be reset to 9
Press any key to continue, or Break to abort
obs was 0, now 9

. svmat FS

. qui replace FR = FR/1e6

. qui replace FS = FS/1e6

. gen int year = _n + 1991

. svmat ZR

. ren ZR1 ZR_LC

. ren ZR2 ZR_DBID

. ren ZR3 ZR_NBID

. ren ZR4 ZR_P1

. svmat ZS

. ren ZS1 ZS_LC

. ren ZS2 ZS_DBID

. ren ZS3 ZS_NBID

. ren ZS4 ZS_P1

. order y FR FS ZR* ZS*

. form F* Z* %8.0f

. l y F*,nod

        year       FR1       FS1
  1.    1992         0         0
  2.    1993         0         0
  3.    1994         0         5
  4.    1995         0         8
  5.    1996         4        16
  6.    1997  [illegible] [illegible]
  7.    1998        16  [illegible]
  8.    1999        50  [illegible]
  9.    2000  [illegible] [illegible]

. l y Z*,nod

        year   ZR_LC  ZR_DBID  ZR_NBID    ZR_P1    ZS_LC  ZS_DBID  ZS_
> NBID     ZS_P1
  1.    1992       0        0        0        0       12        1
> [illegible]  0
  2.    1993       0        0        0        0       15        3
>    1         0
  3.    1994       0        0        0        0      493       26
> [illegible]  11
  4.    1995 [illegible] [illegible]  0       0      829       76
> [illegible]  [illegible]
  5.    1996 [illegible] [illegible] 71      51     1431     1019
> 3373      3825
  6.    1997     757      607     1190     1070     2136     4170
> 7292      5690
  7.    1998    1250     2336     3849     3941     1875     3876
> 7008      6129
  8.    1999    2011    15811    23988     9007     2356    21438     3
> 5339     13032
  9.    2000    2628    14817    24446    11392     3272    19418     3
> 0187     14560

. save Claims_P,replace
(Note: file Claims_P.dta not found)
file Claims_P.dta saved

.
. log close
```

go to:

tab 73, p. 3 (formatted)

WEW 3, p. 4, fn 14

Wecker changes:

- remove asbestos-specific quit rate effect (see p. 5, 10 this tab)

future ↗ ↑ past

R2 3.0 → 1.0

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Compute T0, T3, P4

nir5_r2.do

```
* ©RM500
* nir5: BL-CF differences in proportion of ever-smokers and
* mean smoke-years exposure of claimants in HRA audit files
* Relative risk initiation model hC(t) = r1*hB(t) if year >= T1
* hC(t) = r2*hB(t) if year >= T2, where T2 > T1
* hC(t) = r3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* Age distribution for future claimants from age9.dta
* Baseline cumulative smoking initiation curve from nir3.dta
* crossover insulators excluded

* Scenario    pre-88 misconduct    Estimate    r1     r2     r3
*   BL              -                 -        1.0    1.0    1.0
*   CF             yes               low       1.0    0.8    1.0
*   CF             yes               mid       0.9    0.7    1.0
*   CF             yes               high      0.8    0.6    1.0

clear
prog drop _all
set rmsg off
set more off
set matsize 200

log using nir5, replace

* (1) get distribution of birth year of all claimants from age9.dta
use age9
keep year AllFutur
mkmat year AllFutur
matrix pi = year,AllFutur
matrix drop year AllFutur
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix list pi

* No correction here for year first exposed to asbestos
* (Comparison of output of nir2 and nir3 shows little effect)

* (2) Get baseline cumulative initiation curve from nir3.dta
drop _all
use nir3_r2
gen SB = 1 - FB
lab var x "Age"

* (3) Computation of initation rates in CF scenario
* Cutoff years for decrease in initiation rates are $T1, max($T2,Ylexp), max($T3,Ylexp)
* Relative decrease in initiation rate (on or after year T1) is global variable $r1
* Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global variable $
r2
* Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global variable $
r3

* SB(x) cumulative proportion not smoking through age x in BL scenario.
keep x SB
sort x
order x SB
* Set xMax
* Age 50 set as cutoff for ever smoking
global xMax = 50
drop if x > $xMax
qui sum x
global xMin = r(min)

global N = _N

* Lifetime probability of not smoking by age $xMax in BL scenario
global PB = SB[$N]
* Conditional survival curve in BL scenario
qui gen SB_ = 1 - (1 - SB)/(1 - $PB)
qui sum SB_
* Mean age started among those starting by age $xMax in BL scenario
global XB = $xMin + r(mean)*$N
di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
drop SB_

* SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
qui gen SBr1 = .
qui gen SBr2 = .
qui gen SBr3 = .
qui gen SC = .

prog def getSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global r1 = $_4
  global r2 = $_5
  global r3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }

* Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
  qui replace SBr1 = SB^$r1
  qui replace SBr2 = SB^$r2
  qui replace SBr3 = SB^$r3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t))^(r1-r2)*SB(mi
n(x,T3-t))^(r2-r3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
    local p = pi['i',2]
*   'x1' = age at T1
    local x1 = $T1 - 't'
*   'x2' = age at T2
    local x2 = min($T2 - 't',$xMax)
*   'x3' = age at T3
    local x3 = min($T3 - 't',$xMax)
* Note: x3 >= x2 >= x1
*       'v1' = obs# at age at T1
        local u1 = 'x1' - $xMin
        local v1 = 'x1' - $xMin + 1
*       'v2' = obs# at age at T2
        local u2 = 'x2' - $xMin
        local v2 = 'x2' - $xMin + 1
*       'v3' = obs# at age at T3
        local u3 = 'x3' - $xMin
        local v3 = 'x3' - $xMin + 1
* Note: u3 >= u2 >= u1
        local A1 = SB['u1']^(1-$r1)
        local A2 = SB['u2']^($r1-$r2)
```

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nir5_r2.do


```
      local A3 = SB['u3']^(Sr2-Sr3)
* DEBUGGING
*     di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"[illegible],u2,u3= ", 'u1', 'u2',[illegible]u3
',"v1,v2,v3= ", 'v1', 'v2', 'v3'
*   Null Case:
    if 'x1' >= $xMax {
* DEBUGGING
*     di "Null case"
      qui replace SC = SC + 'p' * SB
    }
    else {
      if 'u3' <= 0 {
* Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
* DEBUGGING
*     di "Case A"
        qui replace SC = SC + 'p' * SBr3
      }
      else {
        if 'u3' > 0 & 'u2' <= 0 {
*     di "Case B"
* Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
* DEBUGGING
          qui replace SC = SC + 'p' * SBr2 in 1/'u3'
          if 'v3' <= $N {
            qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
          }
        }
        else {
          if 'u2' > 0 & 'u1' <= 0 {
* Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*     di "Case C"
            qui replace SC = SC + 'p' * SBr1 in 1/'u2'
            if 'v2' <= 'u3' {
              qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
            }
            if 'v3' <= $N {
              qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
            }
          }
          else {
* Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*     di "Case D"
            qui replace SC = SC + 'p' * SB in 1/'u1'
            qui replace SC = SC + 'p' * SBr1 * 'A1' in 'v1'/'u2'
            if 'v2' <= 'u3' {
              qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'v2'/'u3'
            }
            if 'v3' <= $N {
              qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3'/$N
            }
          }
        }
      }
    }

    local i = 'i' + 1
  }
* Lifetime probability of not smoking by age $xMax in CF scenario
  global PC = SC[$N]
* Conditional survival curve in CF scenario
  tempvar SC_
  qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
  qui sum 'SC_'
* Mean age started among those starting by age $xMax in CF scenario
  global XC = $xMin + r(mean)*$N
  di %7.0f $T1, [illegible] $T2, [illegible], %7.1f $r2, %7.1f $r3, %7.3f $PC - $PB, %7
[illegible] $XC
[illegible]d

prog def rangeSC
  di "      T1      T2      T3      r1      r2      r3   deltaP deltaX"
  getSC 1954 1963 2001 1.0 1.0 1.0
  getSC 1954 1963 2001 1.0 0.9 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  qui gen FC_lo = 1 - SC
  lab var FC_lo "FC (no post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.8 0.8
  qui gen FC7lo = 1 - SC
  lab var FC7lo "FC (post-2000 Misconduct) low est."
  getSC [illegible]
  getSC [illegible] 0.6 [illegible]
  getSC [illegible] 0.9 [illegible]
  getSC [illegible] 0.8 [illegible]

  ******Wecker Change: replace 0.7 with 1.0*****

  *getSC 1954 1963 2001 0.9 0.7 1.0
   getSC 1954 1963 2001 0.9 1.0 1.0

  **************End Wecker Change************

  qui gen FC_ = 1 - SC
  lab var FC_ "FC (no post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.7 0.7
  qui gen FC7 = 1 - SC
  lab var FC7 "FC (post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.6 1.0
  getSC 1954 1963 2001 0.8 0.8 1.0
  getSC 1954 1963 2001 0.8 0.7 1.0
  getSC 1954 1963 2001 0.8 0.6 1.0
  qui gen FC_hi = 1 - SC
  lab var FC_hi "FC (no post-2000 Misconduct) high est."
  getSC 1954 1963 2001 0.8 0.6 0.6
  qui gen FC7hi = 1 - SC
  lab var FC7hi "FC (post-2000 Misconduct) high est."

end

rangeSC

qui gen FB = 1 - SB
* Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumulative Proport
ion Who Have Begun to Smoke")saving(nir5a,replace)
gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumulative Propor
tion Who Have Begun to Smoke")saving(nir5b,replace)
keep x F*
form x %6.0f
form F* %7.3f
save nir5_r2, replace
* List data
l,nod

* Compute changes in proportion who ever smoked
global N = _N
* Baseline scenario:
di %9.3f FB[$N]
```

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nir5_r2.do

```
prog def Results
 di "---      Decrease in proportion smoked      ---"
 di "Post-2000         Low         Middle         High"
 di "Misconduct        Est.        Est.           Est."
 di " Yes    ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[$N] - FC7hi[$N]

 di " No     ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[$N] - FC_hi[$N]

end
Results

log close
A032
```


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nir5.log

```
.
. * (1) get distribution of birth year of all claimants from age9.dta
. use age9

. keep year AllFutur

. mkmat year AllFutur

. matrix pi = year,AllFutur

. matrix drop year AllFutur

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix list pi

pi[72,2]
             t       pi(t)
 r1       1900   .00004113
 r2       1901   .00002101
 r3       1902   .00003102
 r4       1903   .00004538
 r5       1904   .00006578
 r6       1905   .00009443
 r7       1906   .00013421
 r8       1907    .0001888
 r9       1908   .00026279
r10       1909   .00036178
r11       1910   .00049251
r12       1911   .00066282
r13       1912   .00088162
r14       1913   .00115874
r15       1914   .00150459
r16       1915   .00192976
r17       1916   .00244442
r18       1917   .00305756
r19       1918   .00377616
r20       1919   .00460425
r21       1920   .00554198
r22       1921   .00658479
r23       1922   .00772278
r24       1923   .00894043
r25       1924   .01021674
r26       1925   .01152602
r27       1926   .01283937
r28       1927   .01412696
r29       1928    .0153611
r30       1929   .01652004
r31       1930    .0175923
r32       1931   .01858097
r33       1932   .01950742
r34       1933   .02041352
r35       1934   .02136119
r36       1935   .02242851
r37       1936   .02370143
r38       1937   .02526133
r39       1938   .02716919
r40       1939    .0294484
r41       1940   .03206937
r42       1941   .03493946
r43       1942   .03790151
r44       1943   .04074331
r45       1944   .04321814
r46       1945   [illegible]
r47       1946   [illegible]
r48       1947   [illegible]
r49       1948   [illegible]
r50       1949   .04289862
r51       1950   .03982827
r52       1951   .03601309
r53       1952   .03170149
r54       1953   .02716146
r55       1954    .0226488
r56       1955   .01838121
r57       1956   .01452142
r58       1957   .01117046
r59       1958   .00837034
r60       [illegible]   [illegible]
r61       [illegible]   [illegible]
r62       [illegible]   [illegible]
r63       [illegible]   [illegible]
r64       1963   .00137566
r65       1964   .00090207
r66       1965   .00058381
r67       1966   .00037486
r68       1967    .0002404
r69       1968   .00015518
r70       1969   .00010166
r71       1970    .0000681
r72       1971   .00017831

.
. * No correction here for year first exposed to asbestos
. * (Comparison of output of nir2 and nir3 shows little effect)

.
. * (2) Get baseline cumulative initiation curve from nir3.dta
. drop _all

. use nir3_r2

. gen SB = 1 - FB

. lab var x "Age"

.
. * (3) Computation of initation rates in CF scenario
. * Cutoff years for decrease in initiation rates are $T1, max($T2,Ylexp), max(
> $T3,Ylexp)
. * Relative decrease in initiation rate (on or after year T1) is global variab
> le $r1
. * Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global
>  variable $r2
. * Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global
>  variable $r3
.
. * SB(x) cumulative proportion not smoking through age x in BL scenario.
. keep x SB

. sort x

. order x SB

. * Set xMax
. * Age 50 set as cutoff for ever smoking
. global xMax = 50
```

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nir5.log


```
. drop if x > $xMax
(0 observations deleted)

. qui sum x

. global xMin = r(min)

. global N = _N

. * Lifetime probability of not smoking by age $xMax in BL scenario
.   global PB = SB[$N]

. * Conditional survival curve in BL scenario
.   qui gen SB_ = 1 - (1 - SB)/(1 - $PB)

.   qui sum SB_

. * Mean age started among those starting by age $xMax in BL scenario
.   global XB = $xMin + r(mean)*$N

.   di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
Probability of not smoking (by age 50) =    0.243

.   di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
Mean age started (among those starting by age 50) =     20.7

.   drop SB_



. * SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
. qui gen SBr1 = .

. qui gen SBr2 = .

. qui gen SBr3 = .

. qui gen SC = .

. prog def getSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
.   global T1 = $_1
  2.   global T2 = $_2
  3.   global T3 = $_3
  4.   global r1 = $_4
  5.   global r2 = $_5
  6.   global r3 = $_6
  7. * Check T3 > T2 > T1
.   if $T2 <= $T1 | $T3 <= $T2 {
  8.     di "Invalid ",%9.0f $T1,$T2,$T3
  9.     exit
 10.     }
 11.
. * Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
.   qui replace SBr1 = SB^$r1
 12.   qui replace SBr2 = SB^$r2
 13.   qui replace SBr3 = SB^$r3
 14.   qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t)
> )^(r1-r2)*SB(min(x,T3-t))^(r2-r3) for all x
. * Sum over index 'i' (rows of pi)
.   local i = 1
 16.   while 'i' <= $m {
 17.     local t = pi['i',1]
 18.     local p = pi['i',2]
. *     'x1' = age at T1
 19.     local x1 = $T1 - 't'
. *     'x2' = age at T2
 20.     local x2 = min($T2 - 't',$xMax)
 21. *   'x3' = age at T3
.     local x3 = min($T3 - 't',$xMax)
 22. * Note: x3 >= x2 >= x1
. *     'v1' = obs# at age at T1
.     local u1 = 'x1' - $xMin
 23.       local v1 = 'x1' - $xMin + 1
 24. *     'v2' = obs# at age at T2
.     local u2 = 'x2' - $xMin
 25.       local v2 = 'x2' - $xMin + 1
 26. *     'v3' = obs# at age at T3
.     local u3 = 'x3' - $xMin
 27.       local v3 = 'x3' - $xMin + 1
 28. * Note: v3 >= v2 >= v1
.       local A1 = SB['u1']^(1-$r1)
 29.       local A2 = SB['u2']^($r1-$r2)
 30.       local A3 = SB['u3']^($r2-$r3)
 31. * DEBUGGING
. *     di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1'
> , 'u2', 'u3',"v1,v2,v3= ", 'v1', 'v2', 'v3'
. *   Null Case:
.     if 'x1' >= $xMax {
 32. * DEBUGGING
. *     di "Null case"
.       qui replace SC = SC + 'p' * SB
 33.       }
 34.     else {
 35.       if 'u3' <= 0 {
 36. * Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
. * DEBUGGING
. *       di "Case A"
.         qui replace SC = SC + 'p' * SBr3
 37.         }
 38.       else {
 39.         if 'u3' > 0 & 'u2' <= 0 {
 40. *       di "Case B"
. * Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
. * DEBUGGING
.           qui replace SC = SC + 'p' * SBr2 in 1/'u3'
 41.           if 'v3' <= $N {
 42.             qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
 43.             }
 44.           }
 45.         else {
 46.           if 'u2' > 0 & 'u1' <= 0 {
 47. * Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
. *     di "Case C"
.             qui replace SC = SC + 'p' * SBr1 in 1/'u2'
 48.             if 'v2' <= 'u3' {
 49.               qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
 50.               }
 51.             if 'v3' <= $N {
 52.               qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
 53.               }
 54.             }
 55.           else {
 56. * Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
```

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```
.     di "Case D"
          qui replace SC = SC + 'p' * SB in 1/'u1'
              qui replace SC = SC + 'p' * SBr1 * 'A1' in 'u1'/'u2'
              if 'v2' <= 'u3' {
                qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'u2'/'u3'
              }
              if 'v3' <= $N {
                qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3'
> '/$N
              }
            }
          }
        }
      }
    local i = 'i' + 1
  }
 * Lifetime probability of not smoking by age $xMax in CF scenario
  global PC = SC[$N]
 * Conditional survival curve in CF scenario
  tempvar SC_
  qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
  qui sum 'SC_'
 * Mean age started among those starting by age $xMax in CF scenario
  global XC = $xMin + r(mean)*$N
  di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3
> f $PC - $PB, %7.2f $XB - $XC
 end

. prog def rangeSC
  di "      T1      T2      T3      r1      r2      r3   deltaP deltaX"
  getSC 1954 1963 2001 1.0 1.0 1.0
  getSC 1954 1963 2001 1.0 0.9 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  qui gen FC_lo = 1 - SC
  lab var FC_lo "FC (no post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.8 0.8
  qui gen FC7lo = 1 - SC
  lab var FC7lo "FC (post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.7 1.0
  getSC 1954 1963 2001 1.0 0.6 1.0
  getSC 1954 1963 2001 0.9 0.9 1.0
  getSC 1954 1963 2001 0.9 0.8 1.0

  *****Wecker Change: replace 0.7 with 1.0*****

  *getSC 1954 1963 2001 0.9 0.7 1.0
   getSC 1954 1963 2001 0.9 1.0 1.0

  *************End Wecker Change***********

.  qui gen FC_ = 1 - SC
  lab var FC_ "FC (no post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.7 0.7
  qui gen FC7 = 1 - SC
  lab var FC7 "FC (post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.6 1.0
  getSC 1954 1963 2001 0.8 0.8 1.0
  getSC 1954 1963 2001 0.8 0.7 1.0
  getSC 1954 1963 2001 0.8 0.6 1.0
  qui gen FC_hi = 1 - SC
  lab var FC_hi "FC (no post-2000 Misconduct) high est."
  getSC 1954 1963 2001 0.8 0.6 0.6
  qui gen FC7hi = 1 - SC
  lab var FC7hi "FC (post-2000 Misconduct) high est."
 end
```

remove asbestos-specific initiation rate effect (future)

```
. rangeSC
```

T1	T2	T3	r1	r2	r3	deltaP	deltaX
1954	1963	2001	1.0	1.0	1.0	0.000	0.00
1954	1963	2001	1.0	0.9	1.0	0.022	-0.02
1954	1963	2001	1.0	0.8	1.0	0.046	-0.03
1954	1963	2001	1.0	0.8	0.8	0.046	0.00
1954	1963	2001	1.0	0.7	1.0	0.073	-0.01
1954	1963	2001	1.0	0.6	1.0	0.103	0.03
1954	1963	2001	0.9	0.9	1.0	0.030	-0.14
1954	1963	2001	0.9	0.8	1.0	0.055	-0.15
1954	1963	2001	0.9	1.0	1.0	0.008	-0.12
1954	1963	2001	0.9	0.7	0.7	0.083	-0.09
1954	1963	2001	0.9	0.6	1.0	0.113	-0.10
1954	1963	2001	0.8	0.8	1.0	0.064	-0.28
1954	1963	2001	0.8	0.7	1.0	0.092	-0.27
1954	1963	2001	0.8	0.6	1.0	0.124	-0.23
1954	1963	2001	0.8	0.6	0.6	0.126	-0.15

```
.
. qui gen FB = 1 - SB

. * Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
. gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumula
> tive Proportion Who Have Begun to Smoke")saving(nir5a,replace)

. gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumul
> ative Proportion Who Have Begun to Smoke")saving(nir5b,replace)

. keep x F*

. form x %6.0f

. form F* %7.3f

. save nir5_r2, replace
file nir5_r2.dta saved

. * List data
. l,nod
```

	x	FC_lo	FC7lo	FC_	FC7	FC_hi	FC7hi	FB
1.	9	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.	10	0.022	0.022	0.021	0.021	0.019	0.019	0.022
3.	11	0.029	0.029	0.029	0.027	0.026	0.026	0.030
4.	12	0.040	0.040	0.040	0.038	0.036	0.036	0.041
5.	13	0.055	0.055	0.055	0.052	0.049	0.049	0.057
6.	14	0.080	0.080	0.080	0.075	0.070	0.070	0.083
7.	15	0.122	0.122	0.124	0.115	0.107	0.107	0.128
8.	16	0.186	0.186	0.190	0.174	0.162	0.162	0.196
9.	17	0.245	0.245	0.252	0.230	0.214	0.214	0.260
10.	18	0.326	0.326	0.337	0.305	0.284	0.284	0.347
11.	19	0.384	0.384	0.399	0.360	0.335	0.335	0.409
12.	20	0.454	0.454	0.474	0.427	0.397	0.397	0.485
13.	21	0.501	0.501	0.523	0.471	0.439	0.439	0.534
14.	22	0.529	0.529	0.554	0.498	0.465	0.465	0.565
15.	23	0.549	0.549	0.575	0.518	0.483	0.483	0.586
16.	24	0.568	0.568	0.595	0.535	0.499	0.499	0.605
17.	25	0.585	0.585	0.614	0.552	0.515	0.515	0.624
18.	26	0.600	0.600	0.630	0.566	0.529	0.529	0.640

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19.	27	0.614	0.614	0.644	0.579	0.541	0.541	0.654
20.	28	0.622	0.622	0.654	0.588	0.549	0.549	0.664
21.	29	0.629	0.629	0.661	0.594	0.555	0.555	0.671
22.	30	0.641	0.641	0.674	[illegible]	[illegible]	[illegible]	[illegible]
23.	31	0.648	0.648	0.681	[illegible]	[illegible]	[illegible]	[illegible]
24.	32	0.655	0.655	0.689	[illegible]	[illegible]	[illegible]	[illegible]
25.	33	0.662	0.662	0.696	0.626	0.585	0.585	[illegible]
26.	34	0.669	0.669	0.704	0.633	0.593	0.592	0.713
27.	35	0.675	0.675	0.711	0.639	0.598	0.598	0.720
28.	36	0.679	0.679	0.715	0.643	0.602	0.602	0.724
29.	37	0.682	0.682	0.718	0.645	0.604	0.604	0.727
30.	38	0.685	0.685	0.722	0.649	0.608	0.608	0.730
31.	39	0.687	0.687	0.724	0.651	0.609	0.609	0.732
32.	40	0.695	0.695	0.732	0.658	0.616	0.616	0.740
33.	41	0.697	0.697	0.735	0.660	0.619	0.619	0.743
34.	42	0.699	0.699	0.736	0.662	0.620	0.620	0.744
35.	43	0.700	0.700	0.737	0.663	0.621	[illegible]	[illegible]
36.	44	0.701	0.701	0.739	0.664	0.622	[illegible]	[illegible]
37.	45	0.704	0.704	0.742	0.667	0.625	[illegible]	[illegible]
38.	46	0.706	0.706	0.744	0.669	0.627	[illegible]	[illegible]
39.	47	0.708	0.707	0.746	0.670	0.629	0.628	0.754
40.	48	0.708	0.707	0.746	0.670	0.629	0.628	0.754
41.	49	0.709	0.709	0.747	0.672	0.630	0.629	0.755
42.	50	0.711	0.711	0.749	0.674	0.633	0.631	0.757

```
.
. * Compute changes in proportion who ever smoked
. global N = _N

. * Baseline scenario:
. di %9.3f FB[$N]
    0.757

. prog def Results
  1.  di "---       Decrease in proportion smoked      ---"
  2.  di "Post-2000          Low         Middle        High"
  3.  di "Misconduct         Est.        Est.          Est."
  4.  di " Yes    ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[
> $N] - FC7hi[$N]
  5.  di " No     ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[
> $N] - FC_hi[$N]
  6. end

. Results
---       Decrease in proportion smoked      ---
Post-2000          Low         Middle        High
Misconduct         Est.        Est.          Est.
 Yes              0.046        0.083         0.126
 No               0.046        0.008         0.124

.
.
. log close
```

nir6_r2.do

```
* @RM500
* nir6: BL-CF differences in proportion of ever-smokers and
* mean smoke years exposure of claimants in HRA audit files
* Relative risk initiation model hC(t) = r1*hB(t) if year
* hC(t) = r2*hB(t) if year >= T2, where T2
* hC(t) = r3*hB(t) if year >= T3, where
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* T2 = max(T2,ylexp), T3 = max(T3,ylexp): Relative reduction r2 in
* initiation rate begins only after start of employment/exposure to asbestos

* Crossover insulators excluded
* Scenario     pre-88 misconduct     Estimate     r1     r2     r3
*   BL              -                   -        1.0    1.0    1.0
*   CF             yes                 low       1.0    0.8    1.0
*   CF             yes                 mid       0.9    0.7    1.0
*   CF             yes                 high      0.8    0.6    1.0

* Input files: (nir) concatenated HR&A audit samples (from nir1)

clear
prog drop _all
set rmsg off
set more off
set matsize 200


log using nir6, replace
use nir, clear

* (1) Save distribution of yrborn in Matrix pi(t)
* Exclude observations for which yrBegan was imputed in nir1.do
drop if iBegin == 0
* Exclude observations for which date of first exposure to asbestos unknown
drop if Ylexp == .
qui tab yrborn [w=w], matcell(pi) matrow(t_)
matrix pi = pi/_result(1)
matrix pi = t_, pi
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix drop t_
* Distribution of year of birth
matrix list pi

* Tabulate year first exposed to asbestos
tab Ylexp [w=w], missing
qui gen byte smk_exp = yrBegin < Ylexp
lab var smk_exp "Began smoking before 1st employment with asbestos
tab smk_exp [w=w]

* (2) Set up duration variable for initiation analysis
gen int ageEnd = ageBegin
replace ageEnd = yrDied - yrborn if ageEnd == .
replace ageEnd = yrSett - yrborn if ageEnd == .
replace ageEnd = yrRecv - yrborn if ageEnd == .
gen byte smoked = Smoker == 1

* (3) Compute initation survival curve
stset ageEnd [w=w], failure(Smoker) origin(time 0) scale(1) id(poc)
sts generate SB = s
form SB %9.3f
gen byte x = _t
lab var x "Age"
gen FB = 1 - SB
form FB %9.3f
lab var FB "Cumul prop started smoking (BL)"
sort x
drop if x == x[_n-1]
global N = _N + 1
set obs $N
qui sum x
global xMin = r(min) - 1
replace x = $xMin in $N
replace FB = 0. in $N
replace SB = 1. in $N
sort x
form FB %9.0g
gr FB x if x<=50, xlab(10,15,20,25,30,35,40,45,50)ylab(0,.25,.5,.75,1)s(i)c(J)saving(nir3
a,replace)
form FB %9.3f
l x FB if x<=50

* (4) Computation of initiation rates in CF scenario
* Cutoff years for decrease in initiation rates are $T1 and max($T2,Ylexp)
* Relative decrease in initiation rate (on or after year T1) is global variable $r1
* Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global variable $r
2
* Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global variable $r
3

* SB(x) cumulative proportion not smoking through age x in BL scenario.
keep SB x Ylexp

sort x
order x SB
* Set xMax
* Age 50 set as cutoff for ever smoking
global xMax = 50
drop if x > $xMax
qui sum x
global xMin = r(min)
global N = _N

* Lifetime probability of not smoking by age $xMax in BL scenario
  global PB = SB[$N]
* Conditional survival curve in BL scenario
  qui gen SB_ = 1 - (1 - SB)/(1 - $PB)
  qui sum SB_
* Mean age started among those starting by age $xMax in BL scenario
  global XB = $xMin + r(mean)*$N
  di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
  di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
  drop SB_


* SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
qui gen SBr1 = .
qui gen SBr2 = .
qui gen SBr3 = .
gen SC = .

prog def getSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global r1 = $_4
  global r2 = $_5
  global r3 = $_6
```

nir6_r2.do

```
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }

* Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
  qui replace SBr1 = SB^$r1
  qui replace SBr2 = SB^$r2
  qui replace SBr3 = SB^$r3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t))^(r1-r2)*SB(m
in(x,T3-t))^(r2-r3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
    local p = pi['i',2]
*   'x1' = age at T1
    local x1 = $T1 - 't'
*   'x2' = age at T2
    local x2 = min($T2 - 't',$xMax)
*   'x2' = age at max(T2,Ylexp) (later of $T2 and year 1st exposed)
    local x2 = max($T2,Ylexp) - 't'
    local x2 = min('x2', $xMax)

*   'x3' = age at T3
    local x3 = min($T3 - 't',$xMax)
    local x3 = max($T3,Ylexp) - 't'
    local x3 = min('x3', $xMax)

* Note: x3 >= x2 >= x1
*      'v1' = obs# at age at T1
       local u1 = 'x1' - $xMin
       local v1 = 'x1' - $xMin + 1
*      'v2' = obs# at age at T2
       local u2 = 'x2' - $xMin
       local v2 = 'x2' - $xMin + 1
*      'v3' = obs# at age at T3
       local u3 = 'x3' - $xMin
       local v3 = 'x3' - $xMin + 1
* Note: u3 >= u2 >= u1
       local A1 = SB['u1']^(1-$r1)
       local A2 = SB['u2']^($r1-$r2)
       local A3 = SB['u3']^($r2-$r3)
* DEBUGGING
*      di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1', 'u2', 'u3
',"v1,v2,v3= ", 'v1', 'v2', 'v3'
*   Null Case:
    if 'x1' >= $xMax {
* DEBUGGING
*      di "Null case"
       qui replace SC = SC + 'p' * SB
    }
    else {
       if 'u3' <= 0 {
* Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
* DEBUGGING
*      di "Case A"
         qui replace SC = SC + 'p' * SBr3
       }
       else {
         if 'u3' > 0 & 'u2' <= 0 {
*      di "Case B"
* Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
* DEBUGGING
              qui replace SC = SC + 'p' * SBr2 in 1/'u3'
              if 'v3' <= $N {
                qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
              }
            }
            else {
              if 'u2' > 0 & 'u1' <= 0 {
* Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*         di "Case C"
                qui replace SC = SC + 'p' * SBr1 in 1/'u2'
                if 'v2' <= 'u3' {
                  qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
                }
                if 'v3' <= $N {
                  qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
                }
              }
              else {
* Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*         di "Case D"
                qui replace SC = SC + 'p' * SB in 1/'u1'
                qui replace SC = SC + 'p' * SBr1 * 'A1' in 'v1'/'u2'
                if 'v2' <= 'u3' {
                  qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'v2'/'u3'
                }
                if 'v3' <= $N {
                  qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3'/$N
                }
              }
            }
          }
        }

      local i = 'i' + 1
    }
* Lifetime probability of not smoking by age $xMax in CF scenario
  global PC = SC[$N]
* Conditional survival curve in CF scenario
  tempvar SC_
  qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
  qui sum 'SC_'
* Mean age started among those starting by age $xMax in CF scenario
  global XC = $xMin + r(mean)*$N
  di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3f $PC - $PB, %7
.2f $XB - $XC
end

prog def rangeSC
  di "      T1      T2      T3      r1      r2      r3   deltaP deltaX"
  getSC 1954 1963 2001 1.0 1.0 1.0
  getSC 1954 1963 2001 1.0 0.9 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  qui gen FC_lo = 1 - SC
  lab var FC_lo "FC (no post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.8 0.8
  qui gen FC7lo = 1 - SC
  lab var FC7lo "FC (post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.7 1.0
  getSC 1954 1963 2001 1.0 0.6 1.0
  getSC 1954 1963 2001 0.9 0.9 1.0
  getSC 1954 1963 2001 0.9 0.8 1.0
```


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nir6_r2.do

```
****Wecker Change: replace 0.7 with 1.0*******
 *getSC 1954 1963 2001 0.9 0.7 1.0
 getSC 1954 1963 2001 0.9 1.0 1.0
***********End Wecker Change***********
qui gen FC_ = 1 - SC
lab var FC_ "FC (no post-2000 Misconduct) mid est."
getSC 1954 1963 2001 0.9 0.7 0.7
qui gen FC7 = 1 - SC
lab var FC7 "FC (post-2000 Misconduct) mid est."
getSC 1954 1963 2001 0.9 0.6 1.0
getSC 1954 1963 2001 0.8 0.8 1.0
getSC 1954 1963 2001 0.8 0.7 1.0
getSC 1954 1963 2001 0.8 0.6 1.0
qui gen FC_hi = 1 - SC
lab var FC_hi "FC (no post-2000 Misconduct) high est."
getSC 1954 1963 2001 0.8 0.6 0.6
qui gen FC7hi = 1 - SC
lab var FC7hi "FC (post-2000 Misconduct) high est."
end

langeSC

qui gen FB = 1 - SB
* Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
gr FC_ FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumulative Propor
tion Who Have Begun to Smoke")saving(nir6a,replace)
gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumulative Propo
rtion Who Have Begun to Smoke")saving(nir6b,replace)
keep x F*
form x %6.0f
form F* %7.3f
save nir6_r2, replace
* List data
l,nod

* Compute changes in proportion who ever smoked
global N = _N
* Baseline scenario:
di %9.3f FB[$N]
prog def Results
di "---          Decrease in proportion smoked           ---"
di "Post-2000
di "Misconduct      Low         Middle          High"
di " Yes         Est.          Est.            Est."
 "%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[$N] - FC7hi[$N
}
di " No    "%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[$N] - FC_hi[$N
}
end
Results

log close
\032
```


52614 0798

nir6.log

```
. use nir, clear

. * (1) Save distribution of yrborn in matrix pi(t)
. * Exclude observations for which yrBegin [illegible]
. drop if iBegin == 0
(193 observations deleted)

. * Exclude observations for which date of first exposure to asbestos unknown
. drop if Ylexp == .
(47 observations deleted)

. qui tab yrborn [w=w], matcell(pi) matrow(t_)

. matrix pi = pi/_result(1)

. matrix pi = t_, pi

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix drop t_

. * Distribution of year of birth
. matrix list pi

pi[64,2]
          t        pi(t)
r1      1896  .00018528
r2      1897  .00014319
r3      1898   .0001936
r4      1900  .00063647
r5      1901  .00113331
r6      1902  .00016957
r7      1903  .00113415
r8      1904  .00063443
r9      1905  .00281819
r10     1906  .00332298
r11     1907  .00449854
r12     1908  .00365987
r13     1909  .00763218
r14     1910  .00601509
r15     1911  .00871055
r16     1912  .00815244
r17     1913   .0137759
r18     1914  .01685662
r19     1915  .01611698
r20     1916  .01891755
r21     1917  .02051612
r22     1918  .02706036
r23     1919  .02981462
r24     1920  .02726175
r25     1921  .03644682
r26     1922  .03416953
r27     1923  .03654592
r28     1924  .03229662
r29     1925  .04102194
r30     1926  .03281913
r31     1927   .0487059
r32     1928  .04231479
r33     1929  .02749656
r34     1930  .02990647
r35     1931  .02959857
r36     1932  .02196196
[illegible] 1933  [illegible]
[illegible] 1934  [illegible]
[illegible] 1935  [illegible]
[illegible] 1936  [illegible]
r41     1937  .02655839
r42     1938  .02412411
r43     1939  .02616626
r44     1940  .02094601
[illegible] 1941  .01744799
[illegible] 1942  .02677041
[illegible] 1943  .01544061
r48     1944  .01626907
r49     1945  .01590855
r50     1946  .01662858
[illegible] 1947  [illegible]
[illegible] 1948  [illegible]
r53     1949  [illegible]
r54     1950  [illegible]
r55     1951  .00809841
r56     1952  .00559396
r57     1953  .00404073
r58     1954  .00267647
r59     1955   .0015045
r60     1956  .00106411
r61     1957  .00056056
r62     1958  .00045207
r63     1959   .0008493
r64     1965  .00045207

. * Tabulate year first exposed to asbestos
. tab Ylexp [w=w], missing
(frequency weights assumed)
```

Year 1st Exposed to Asbestos	Freq.	Percent	Cum.
1912	986	0.00	0.00
1916	290	0.00	0.00
1920	40840	0.14	0.14
1921	3110	0.01	0.15
1922	19809	0.07	0.22
1923	56285	0.19	0.41
1924	8718	0.03	0.44
1925	36357	0.12	0.56
1926	23378	0.08	0.64
1927	19837	0.07	0.70
1928	42169	0.14	0.84
1929	39256	0.13	0.98
1930	34287	0.12	1.09
1931	57118	0.19	1.28
1932	34116	0.11	1.40
1933	101397	0.34	1.74
1934	109712	0.37	2.11
1935	198040	0.66	2.77
1936	271812	0.91	3.68
1937	323316	1.09	4.77
1938	264281	0.89	5.66
1939	421068	1.41	7.07
1940	999414	3.35	10.42
1941	1236684	4.15	14.57

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mir6.log

```
 1942 |    1283368      4.31     18.88
 1943 |    1198442      4.02     22.90
 1944 |     702165      2.36     25.26
 1945 |    1011878      3.40     28.66
 1946 |    1189366      3.99     32.64
 1947 |     976726      3.28     35.92
 1948 |    1080973      3.63     39.55
 1949 |     608863      2.04     41.59
 1950 |     889106      2.98     44.58
 1951 |    1196194      4.01     48.59
 1952 |    1257412      4.22     52.81
 1953 |     978183      3.28     56.09
 1954 |     500674      1.68     57.77
 1955 |     920743      3.09     60.86
 1956 |     661422      2.22     63.08
 1957 |     680420      2.28     65.37
 1958 |     822919      2.76     68.13
 1959 |     801776      2.69     70.82
 1960 |     617207      2.07     72.89
 1961 |     437519      1.47     74.36
 1962 |     668138      2.24     76.60
 1963 |     605962      2.03     78.63
 1964 |     928567      3.12     81.75
 1965 |    1013328      3.40     85.15
 1966 |     879274      2.95     88.10
 1967 |     542736      1.82     89.92
 1968 |     634357      2.13     92.05
 1969 |     524800      1.76     93.81
 1970 |     460072      1.54     95.36
 1971 |     294009      0.99     96.34
 1972 |     331490      1.11     97.46
 1973 |     275810      0.93     98.38
 1974 |     227880      0.76     99.15
 1975 |      68952      0.23     99.38
 1976 |      36228      0.12     99.50
 1977 |      29142      0.10     99.60
 1978 |       5640      0.02     99.62
 1979 |      45593      0.15     99.77
 1980 |      30175      0.10     99.87
 1985 |      13471      0.05     99.92
 1988 |      25308      0.08    100.00
------------+-----------------------------------
      Total |   29798568    100.00

. qui gen byte smk_exp = yrBegin < Ylexp

. lab var smk_exp "Began smoking before 1st employment with asbestos

. tab smk_exp [w=w]
(frequency weights assumed)

      Began |
    smoking |
 before 1st |
 employment |
       with |
   asbestos |      Freq.     Percent        Cum.
------------+-----------------------------------
          0 |   15219351       51.07       51.07
          1 |   14579217       48.93      100.00
------------+-----------------------------------
      Total |   29798568      100.00

. * (2) Set up duration variable for initiation analysis

. gen int ageEnd = ageBegin
(601 missing values generated)

. replace ageEnd = yrDied - yrborn if ageEnd == .
(0 real changes made)

. replace ageEnd = yrSett - yrborn if ageEnd == .
(524 real changes made)

. replace ageEnd = yrRecv - yrborn if ageEnd == .
(77 real changes made)

. gen byte smoked = Smoker == 1

.
. * (3) Compute initation survival curve
. stset ageEnd [w=w], failure(Smoker) origin(time 0) scale(1) id(poc)
(frequency weights assumed)

                id:  poc
     failure event:  Smoker ~= 0 & Smoker ~= .
obs. time interval:  (ageEnd[_n-1], ageEnd]
 exit on or before:  failure
            weight:  [fweight=w]

------------------------------------------------------------------------------
     3881  total obs.
        0  exclusions
------------------------------------------------------------------------------
     3881  physical obs. remaining, equal to
 2.98e+07  weighted obs., representing
 2.98e+07  subjects
 2.28e+07  failures in single failure-per-subject data
 9.49e+08  total analysis time at risk, at risk from t =         0
                             earliest observed entry t =         0
                                  last observed exit t =        95

. sts generate SB = s

. form SB %9.3f

. gen byte x = _t

. lab var x "Age"

. gen FB = 1 - SB

. form FB %9.3f

. lab var FB "Cumul prop started smoking (BL)"

. sort x

. drop if x == x[_n-1]
(3796 observations deleted)

. global N = _N + 1

. set obs $N
obs was 85, now 86

. qui sum x

. global xMin = r(min) - 1
```

nir6.log

```
. replace x = $xMin in $N
(1 real change made)

. replace FB = 0. in $N
(1 real change made)

. replace SB = 1. in $N
(1 real change made)

. sort x

. form FB %9.0g

. gr FB x if x<=50, xlab(10,15,20,25,30,35,40,45,50)ylab(0,.25,.5,.75,1)s(i)c(J
> )saving(nir3a,replace)

. form FB %9.3f

. l x FB if x<=50

        x      FB
  1.    9   0.000
  2.   10   0.022
  3.   11   0.030
  4.   12   0.041
  5.   13   0.057
  6.   14   0.083
  7.   15   0.128
  8.   16   0.196
  9.   17   0.260
 10.   18   0.347
 11.   19   0.409
 12.   20   0.485
 13.   21   0.534
 14.   22   0.565
 15.   23   0.586
 16.   24   0.605
 17.   25   0.624
 18.   26   0.640
 19.   27   0.654
 20.   28   0.664
 21.   29   0.671
 22.   30   0.684
 23.   31   0.691
 24.   32   0.698
 25.   33   0.705
 26.   34   0.713
 27.   35   0.720
 28.   36   0.724
 29.   37   0.727
 30.   38   0.730
 31.   39   0.732
 32.   40   0.740
 33.   41   0.743
 34.   42   0.744
 35.   43   0.746
 36.   44   0.747
 37.   45   0.750
 38.   46   0.752
 39.   47   0.754
 40.   48   0.754
 41.   49   0.755
 42.   50   0.757
```

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```
. * (4) Computation of initation rates in CF scenario
. * Cutoff years for decrease in initiation rates are $T1 and max($T2,Ylexp)
. * Relative decrease in initiation rate (on or after year T1) is global variab
> le $r1
. * Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global
> variable $r2
. * Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global
> variable $r3
.
. * SB(x) cumulative proportion not smoking through age x in BL scenario.
. keep SB x Ylexp

. sort x

. order x SB

. * Set xMax
. * Age 50 set as cutoff for ever smoking
. global xMax = 50

. drop if x > $xMax
(44 observations deleted)

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * Lifetime probability of not smoking by age $xMax in BL scenario
.   global PB = SB[$N]

. * Conditional survival curve in BL scenario
.   qui gen SB_ = 1 - (1 - SB)/(1 - $PB)

.   qui sum SB_

. * Mean age started among those starting by age $xMax in BL scenario
.   global XB = $xMin + r(mean)*$N

.   di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
Probability of not smoking (by age 50) =    0.243

.   di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
Mean age started (among those starting by age 50) =     20.7

.   drop SB_

.
. * SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
. qui gen SBr1 = .

. qui gen SBr2 = .

. qui gen SBr3 = .

. gen SC = .
(42 missing values generated)

.
. prog def getSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
```

nir6.log

```
global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global r1 = $_4
  global r2 = $_5
  global r3 = $_6
  * Check T3 > T2 > T1
 if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }

* Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
 qui replace SBr1 = SB^$r1
  qui replace SBr2 = SB^$r2
  qui replace SBr3 = SB^$r3
  qui replace SC = 0
  * Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r2)*SB(min(x,T2-t))
> )^(r1-r2)*SB(min(x,T3-t))^(r2-r3) for all x
* Sum over index `i' (rows of pi)
 local i = 1
  while `i' <= $m {
    local t = pi[`i',1]
    local p = pi[`i',2]
  *  `x1' = age at T1
   local x1 = $T1 - `t'
  *  `x2' = age at T2
   local x2 = min($T2 - `t',$xMax)
*  `x2' = age at max(T2,Ylexp) (later of $T2 and year 1st exposed)
   local x2 = max($T2,Ylexp) - `t'
    local x2 = min(`x2', $xMax)

*  `x3' = age at T3
   local x3 = min($T3 - `t',$xMax)
   local x3 = max($T3,Ylexp) - `t'
    local x3 = min(`x3', $xMax)

* Note: x3 >= x2 >= x1
*     `v1' = obs# at age at T1
     local u1 = `x1' - $xMin
       local v1 = `x1' - $xMin + 1
  *    `v2' = obs# at age at T2
     local u2 = `x2' - $xMin
       local v2 = `x2' - $xMin + 1
  *    `v3' = obs# at age at T3
     local u3 = `x3' - $xMin
       local v3 = `x3' - $xMin + 1
 * Note: u3 >= u2 >= u1
     local A1 = SB[`u1']^(1-$r1)
       local A2 = SB[`u2']^($r1-$r2)
       local A3 = SB[`u3']^($r2-$r3)
 * DEBUGGING
*      di "i= ",`i',"t= ",`t',"x1,x2,x3= ",`x1', `x2', `x3',"u1,u2,u3= ", `u1'
> , `u2', `u3',"v1,v2,v3= ", `v1', `v2', `v3'
*    Null Case:
    if `x1' >= $xMax {
 * DEBUGGING
*      di "Null case"
     qui replace SC = SC + `p' * SB
      }
      else {
        if `u3' <= 0 {
 * Case A: `u1' <= 0 & `u2' <= 0 & `u3' <= 0
* DEBUGGING
*      di "Case A"
          qui replace SC = SC + `p' * SBr3
        }
        else {
          if `u1' <= 0 & `u2' <= 0
* di "Case B"
* Case B: `u1' <= 0 & `u2' <= 0 & `u3' > 0
* DEBUGGING
           qui replace SC = SC + `p' * SBr2 in 1/`u3'
           if `v3' <= $N {
             qui replace SC = SC + `p' * SBr3 * `A3' in `v3'/$N
           }
          }
          else {
            if `u2' > 0 & `u1' <= 0 {
 * Case C: `u1' <= 0 & `u2' > 0 & `u3' > 0
* DEBUGGING
*      di "Case C"
              qui replace SC = SC + `p' * SBr1 in 1/`u2'
              *  `v2' <= `u3'
              qui replace SC = SC + `p' * SBr2 * `A2' in `v2'/`u3'
            }
            if `v3' <= $N {
              qui replace SC = SC + `p' * SBr3 * `A2' * `A3' in `v3'/$N
            }
          }
          else {
 * Case D: `u1' > 0 & `u2' > 0 & `u3' > 0
* DEBUGGING
*      di "Case D"
            qui replace SC = SC + `p' * SB in 1/`u1'
              qui replace SC = SC + `p' * SBr1 * `A1' in `v1'/`u2'
              if `v2' <= `u3' {
                qui replace SC = SC + `p' * SBr2 * `A1' * `A2' in `v2'/`u3'
              }
              if `v3' <= $N {
                qui replace SC = SC + `p' * SBr3 * `A1' * `A2' * `A3' in `v3
> '/$N
              }
            }
          }
        }
      }

    local i = `i' + 1
  }
 * Lifetime probability of not smoking by age $xMax in CF scenario
  global PC = SC[$N]
 * Conditional survival curve in CF scenario
  tempvar SC_
  qui gen `SC_' = 1 - (1 - SC)/(1 - $PC)
  qui sum `SC_'
 * Mean age started among those starting by age $xMax in CF scenario
  global XC = $xMin + r(mean)*$N
  di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3
> f $PC - $PB, %7.2f $XB - $XC
 end

. prog def rangeSC
  di "      T1      T2      T3      r1      r2      r3   deltaP deltaX"
  getSC 1954 1963 2001 1.0 1.0 1.0
  getSC 1954 1963 2001 1.0 0.9 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  qui gen FC_lo = 1 - SC
  lab var FC_lo "FC (no post-2000 Misconduct) low est."
```

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```
 7.   getSC 1954 1963 2001 1.0 0.8 0.8
 8.   qui gen FC7lo = 1 - SC
 9.   lab var FC7lo "FC (post-2000 Misconduct) low est."
10.   getSC 1954 1963 2001 1.0 0.7 1.0
11.   getSC 1954 1963 2001 1.0 0.6 1.0
12.   getSC 1954 1963 2001 0.9 0.9 1.0
13.   getSC 1954 1963 2001 0.9 0.8 1.0
14.
  ****Wecker Change: replace 0.7 with 1.0*******

   *getSC 1954 1963 2001 0.9 0.7 1.0
    getSC 1954 1963 2001 0.9 1.0 1.0
15.
  ************End Wecker Change************
   qui gen FC_ = 1 - SC
16.   lab var FC_ "FC (no post-2000 Misconduct) mid est."
17.   getSC 1954 1963 2001 0.9 0.7 0.7
18.   qui gen FC7 = 1 - SC
19.   lab var FC7 "FC (post-2000 Misconduct) mid est."
20.   getSC 1954 1963 2001 0.9 0.6 1.0
21.   getSC 1954 1963 2001 0.8 0.8 1.0
22.   getSC 1954 1963 2001 0.8 0.7 1.0
23.   getSC 1954 1963 2001 0.8 0.6 1.0
24.   qui gen FC_hi = 1 - SC
25.   lab var FC_hi "FC (no post-2000 Misconduct) high est."
26.   getSC 1954 1963 2001 0.8 0.6 0.6
27.   qui gen FC7hi = 1 - SC
28.   lab var FC7hi "FC (post-2000 Misconduct) high est."
29.
. end
```

remove [illegible]-specific initiation rate effect (past)

. rangeSC

T1	T2	T3	r1	r2	r3	deltaP	deltaX
1954	1963	2001	1.0	1.0	1.0	0.000	0.00
1954	1963	2001	1.0	0.9	1.0	0.008	0.06
1954	1963	2001	1.0	0.8	1.0	0.017	0.13
1954	1963	2001	1.0	0.8	0.8	0.018	0.15
1954	1963	2001	1.0	0.7	1.0	0.027	0.21
1954	1963	2001	1.0	0.6	1.0	0.037	0.30
1954	1963	2001	0.9	0.9	1.0	0.016	0.03
1954	1963	2001	0.9	0.8	1.0	0.025	0.10
1954	1963	2001	0.9	1.0	1.0	0.008	-0.04
1954	1963	2001	0.9	0.7	0.7	0.036	0.21
1954	1963	2001	0.9	0.6	1.0	0.046	0.28
1954	1963	2001	0.8	0.8	1.0	0.034	0.07
1954	1963	2001	0.8	0.7	1.0	0.045	0.15
1954	1963	2001	0.8	0.6	1.0	0.056	0.25
1954	1963	2001	0.8	0.6	0.6	0.057	0.30

```
. qui gen FB = 1 - SB

. * Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
. gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumula
> tive Proportion Who Have Begun to Smoke")saving(nir6a,replace)

. gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumul
> ative Proportion Who Have Begun to Smoke")saving(nir6b,replace)

. keep x F*

. form x %6.0f

. form F* %7.3f

. save nir6_r2, replace
file nir6_r2.dta saved

. list data
. 1.nod
```

	x	FC_lo	FC7lo	FC_	FC7	FC_hi	FC7hi	FB
1.	9	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.	10	0.022	0.022	0.022	0.022	0.022	0.022	0.022
3.	11	0.030	0.030	0.029	0.029	0.029	0.029	0.030
4.	12	0.041	0.041	0.041	0.041	0.040	0.040	0.041
5.	13	0.056	0.056	0.056	0.056	0.055	0.055	0.057
6.	14	0.082	0.082	0.082	0.081	0.080	0.080	0.083
7.	15	0.128	0.128	0.127	0.125	0.123	0.123	0.128
8.	16	0.195	0.195	0.194	0.191	0.187	0.187	0.196
9.	[illegible]	[illegible]	0.257	0.256	0.252	0.247	0.247	0.260
10.	[illegible]	[illegible]	0.343	0.342	0.336	0.328	0.328	0.347
11.	[illegible]	[illegible]	0.404	0.404	0.396	0.387	0.387	0.409
12.	20	0.478	[illegible]	0.478	0.468	0.457	0.457	0.485
13.	21	0.527	0.527	0.527	0.516	0.504	0.504	0.534
14.	22	0.557	0.557	0.558	0.545	0.532	0.532	0.565
15.	23	0.577	0.577	0.579	0.565	0.552	0.552	0.586
16.	24	0.596	0.596	0.598	0.584	0.570	0.570	0.605
17.	25	0.615	0.615	0.617	0.601	0.587	0.587	0.624
18.	26	0.630	0.630	0.632	0.616	0.601	0.601	0.640
19.	27	0.644	0.644	0.647	0.630	0.614	0.614	0.654
20.	28	0.653	0.653	0.656	0.638	0.622	0.622	0.664
21.	29	0.659	0.659	0.663	0.645	0.629	0.629	0.671
22.	30	0.672	0.672	0.676	0.657	0.640	0.640	0.684
23.	31	0.679	0.679	0.683	0.663	0.646	0.646	0.691
24.	32	0.686	0.686	0.690	0.670	0.653	0.653	0.698
25.	33	0.692	0.692	0.697	0.676	0.659	0.659	0.705
26.	34	0.700	0.700	0.705	0.684	0.665	0.665	0.713
27.	35	0.706	0.706	0.712	0.689	0.671	0.671	0.720
28.	36	0.710	0.710	0.716	0.693	0.674	0.674	0.724
29.	37	0.712	0.712	0.719	0.695	0.676	0.676	0.727
30.	38	0.716	0.716	0.722	0.699	0.679	0.679	0.730
31.	39	0.717	0.717	0.724	0.700	0.681	0.681	0.732
32.	40	0.725	0.725	0.732	0.707	0.687	0.687	0.740
33.	41	0.727	0.727	0.735	0.709	0.689	0.689	0.743
34.	42	0.728	0.728	0.736	0.710	0.690	0.690	0.744
35.	43	0.729	0.729	0.738	0.711	0.691	0.691	0.746
36.	44	0.731	0.731	0.739	0.712	0.692	0.692	0.747
37.	45	0.734	0.733	0.742	0.715	0.695	0.695	0.750
38.	46	0.735	0.735	0.744	0.717	0.696	0.696	0.752
39.	47	0.736	0.736	0.746	0.718	0.697	0.697	0.754
40.	48	0.736	0.736	0.746	0.718	0.697	0.697	0.754
41.	49	0.738	0.738	0.747	0.719	0.698	0.698	0.755
42.	50	0.740	0.739	0.749	0.721	0.701	0.700	0.757

```
. * Compute changes in proportion who ever smoked
. global N = _N

. * Baseline scenario:
. di %9.3f FB[$N]
    0.757

. prog def Results
  1.  di "---       Decrease in proportion smoked       ---"
  2.  di "Post-2000          Low          Middle          High"
  3.  di "Misconduct         Est.         Est.            Est."
  4.  di " Yes    ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB(
```

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nir6.log

```
> $N] = FC7hi[$N]
  5.  di " No      ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[
> $N] - FC_hi[$N]
  6. end

. Results
---        Decrease in proportion smoked         ---
Post-2000         Low          Middle         High
Misconduct        Est.          Est.          Est.
 Yes             0.018         0.036         0.057
 No              0.017         0.008         0.056

. log close
```


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nqr7_R2.do

```
* @RM500`
* nqr7: BL-CF differences in mean smoke-years exposure
* based upon empirical smoke-survival curve and mortality
* of claimants in HRA audit files (excluding Insulator crossovers)
* Relative risk quitting model hC(t) = R1*hB(t) if T2 > year >= T1
* hC(t) = R2*hB(t) if T3 > year >= T2, where T2 > T1
* hC(t) = R3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* Projection to future claimants based upon birth-year distribution pi()
* derived from age9.dta and distribution of ever-smokers by birth cohort
* from nir.dta

clear
prog drop _all
set matsize 400
set rmsg off
set more off

log using nqr7, replace

* cutoff years for changes in quit rates are global variables $T1, $T2, $T3
* Relative increase in quit rate (on or after year T1) is global variable $R1
* Relative increase in quit rate (on or after year T2) is global variable $R2
* Relative increase in quit rate (on or after year T3) is global variable $R3
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)

* (1a) get distribution of birth year of all future claimants from age9.dta
use age9
keep year AllFutur
mkmat year AllFutur
matrix pi = year,AllFutur
matrix drop year AllFutur
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix list pi
drop _all

* (1b) Compute ever-smoking prevalence by birth cohort from nir.dta
* Note: 'nir.dta' excludes Insulator crossovers
drop _all
use nir
keep coh Smok w
tab coh [w=w], sum(Smok)

* Matrix E holds ever-smoking prevalence by cohort
matrix E = (1880, 1909 \ 1910, 1919 \ 1920, 1929 \ 1930, 1939 \ 1940, 1971 )
matrix E = E, J(5,1,0)
matrix colnames E = t0 t1 Ever

prog def setE
  local i = 1
  while 'i' <= 5 {
    qui sum Smok [w=w] if coh == 'i'
    matrix E['i',3] = r(mean)
    local i =  'i' + 1
  }
end
setE
matrix li E

* (1c) Compute conditional distribn of birth year pi() among ever smokers

drop _all
svmat pi
ren pi1 t
ren pi2 pi
qui gen pi_ = .
form pi* %9.4f

prog def getpi
 local i = 1
 while 'i' <= 5 {
   replace pi_ = pi*E['i',3] if t >= E['i',1] & t <= E['i',2]
*    Note:  In CF with pre-1988 misconduct, ever-smoking prevalence
*    of 1940+ birth cohort will be reduced by 3.6%. (nir4.log).
*    But this feedback effect is very small.
   local i = 'i' + 1
 }
 qui sum pi_
 global sumPi = r(mean)*r(N)
 qui replace pi_ = pi_/$sumPi
end
getpi

* Replace pi_ in 2nd col of matrix pi()
mkmat pi_
matrix pi = pi[1..$m,1..1]
matrix pi = pi,pi_


* (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

drop _all
* Get L and SB from nqr4 output
use nqr4
qui sum x
global xMin = r(min)
global N = _N

* LSB is proportion who are still smoking and alive
gen LSB = L*SB
qui sum LSB
* EB is mean smoke-years taking mortality into account
global EB = r(mean)*$N
di "Mean smoke-years (BL) = ",%9.2f $EB
* LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
gen LSBR1 = .
gen LSBR2 = .
gen LSBR3 = .
gen SC = .

prog def LSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global R1 = $_4
  global R2 = $_5
  global R3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }
* Compute SB(x)^R1 and L(x)*SB(x)^R1
* Compute SB(x)^R2 and L(x)*SB(x)^R2
* Compute SB(x)^R3 and L(x)*SB(x)^R3
```

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nqr7_R2.do

```
qui replace LSBR1 = L*SB^$R1
qui replace LSBR2 = L*SB^$R2
qui replace LSBR3 = L*SB^$R3
qui replace SC = 0
* Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R1*SB(min(x,T2-t))^(R1-R2)*
* SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all
* Sum over index `i' (rows of pi)
local i = 1
while `i' <= $m {
  local t = pi[`i',1]
  *`t' year of birth
  local u1 = $T1 - `t' - $xMin - 1
  local v1 = `u1' + 1
  local u2 = $T2 - `t' - $xMin - 1
  local v2 = `u2' + 1
  local u3 = min($T3 - `t' - $xMin - 1,$N)
  local v3 = `u3' + 1
  *Compute intermediate 'areas'
  local A1 = SB[`u1']^(1-$R1)
  local A2 = SB[`u2']^($R1-$R2)
  local A3 = SB[`u3']^($R2-$R3)
  *`u3' > `u2' > `u1' required
  *Case A:
  if `u3' <= 0 {
    qui replace SC = SC + pi[`i',2] * LSBR3
  }
  else {
  *Case B:
   if `u3' > 0 & `u2' <= 0 {
    qui replace SC = SC + pi[`i',2] * LSBR2 in 1/`u3'
     if `v3' <= $N {
      qui replace SC = SC + pi[`i',2] * LSBR3 * `A3' in `v3'/$N
     }
   }
   else {
  *Case C:
     if `u2' > 0 & `u1' <= 0 {
      qui replace SC = SC + pi[`i',2] * LSBR1 in 1/`u2'
      qui replace SC = SC + pi[`i',2] * LSBR2 * `A2' in `v2'/`u3'
      if `v3' <= $N {
        qui replace SC = SC + pi[`i',2] * LSBR3 * `A2' * `A3' in `v3'/$N
      }
     }
     else {
  *Case D:
      qui replace SC = SC + pi[`i',2] * LSB in 1/`u1'
      qui replace SC = SC + pi[`i',2] * LSBR1 * `A1' in `v1'/`u2'
      qui replace SC = SC + pi[`i',2] * LSBR2 * `A1' * `A2' in `v2'/`u3'
      if `v3' <= $N {
        qui replace SC = SC + pi[`i',2] * LSBR3 * `A1' * `A2' * `A3' in `v3'/$N
      }
     }
   }
  }
  local i = `i' + 1
 }
 qui sum SC
 global EC = r(mean)*$N
 di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB,%8.2f $EC,%8.
2f $EB - $EC
end

prog def rangeSC
 di "      T1       T2       T3       R1       R2       R3       XB       XC    deltaX"
 LSC 1954 1963 2001 1.0 2.1 1.0
 qui gen SC_lo = SC
 lab var SC_lo "SC (R=1 post-2000) low est."
 LSC 1954 1963 2001 1.0 2.1 1.1
 LSC 1954 1963 2001 1.0 2.4 1.0
 LSC 1954 1963 2001 1.0 3.0 1.0
 LSC 1954 1963 2001 1.0 3.6 1.0

 LSC 1954 1963 2001 1.5 2.4 1.0

 ******Wecker Change: change 3.0 to 1.0******

 *LSC 1954 1963 2001 1.5 3.0 1.0
 LSC 1954 1963 2001 1.5 1.0 1.0

 **************End Wecker Change************

 qui gen SC_ = SC
 lab var SC_ "SC (R=1 post-2000) middle est."
 LSC 1954 1963 2001 1.5 3.0 3.0
 qui gen SC3 = SC
 lab var SC3 "SC (R=3 post-2000) middle est."

 LSC 1954 1963 2001 1.5 3.6 1.0
 LSC 1954 1963 2001 2.0 2.4 1.0
 LSC 1954 1963 2001 2.0 3.0 1.0
 LSC 1954 1963 2001 2.0 3.6 1.0
 LSC 1954 1963 2001 2.0 3.9 1.0
 qui gen SC_hi = SC
 lab var SC_hi "SC (R=1 post-2000) high est."
 LSC 1954 1963 2001 2.0 3.9 3.9

 LSC 1954 1963 1999 1.5 3.0 1.0
 LSC 1954 1963 2000 1.5 3.0 1.0

end

rangeSC

gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1("Proportion
 Still Alive and Smoking")saving(nqr7a,replace)
gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(JJJ)l1("Prop
ortion Still Alive and Smoking")saving(nqr7b,replace)

form LSB SC* %7.3f
form x %6.0f
keep x LSB SC_*
l, nod
save nqr7_R2, replace


log close

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```


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nqr7.log

```
.
. * Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
. * Relative increase in quit rate (on or after year T1) is global variable $R1
. * Relative increase in quit rate (on or after year T2) is global variable $R2
. * Relative increase in quit rate (on or after year T3) is global variable $R3
. * (R3 can be any value, not just 1; T3 can be any value, not just 1999)
.
. * (1a) get distribution of birth year of all future claimants from age9.dta
. use age9

. keep year AllFutur

. mkmat year AllFutur

. matrix pi = year,AllFutur

. matrix drop year AllFutur

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix list pi

pi[72,2]
             t       pi(t)
 r1       1900   .00004113
 r2       1901   .00002101
 r3       1902   .00003102
 r4       1903   .00004538
 r5       1904   .00006578
 r6       1905   .00009443
 r7       1906   .00013421
 r8       1907    .0001888
 r9       1908   .00026279
r10       1909   .00036178
r11       1910   .00049251
r12       1911   .00066282
r13       1912   .00088162
r14       1913   .00115874
r15       1914   .00150459
r16       1915   .00192976
r17       1916   .00244442
r18       1917   .00305756
r19       1918   .00377616
r20       1919   .00460425
r21       1920   .00554198
r22       1921   .00658479
r23       1922   .00772278
r24       1923   .00894043
r25       1924   .01021674
r26       1925   .01152602
r27       1926   .01283937
r28       1927   .01412696
r29       1928    .0153611
r30       1929   .01652004
r31       1930    .0175923
r32       1931   .01858097
r33       1932   .01950742
r34       1933   .02041352
r35       1934   .02136119
r36       1935   .02242851
r37       1936   .02370143
r38       1937   .02526133
r39       1938   .02716919
r40       1939   [illegible]
r41       1940   [illegible]
r42       1941   [illegible]
r43       1942   .03790151
r44       1943   .04074331
r45       1944   .04321814
r46       1945   .04507414
r47       1946   .04608816
r48       1947   .04609812
r49       1948    .0450277
r50       1949   .04289862
r51       1950   .03982827
r52       1951   .03601309
r53       1952   .03170149
r54       1953   [illegible]
r55       1954   [illegible]
r56       1955   [illegible]
r57       1956   [illegible]
r58       1957   .01117046
r59       1958   .00837034
r60       1959   .00611337
r61       1960   .00435552
r62       1961   .00303046
r63       1962   .00206233
r64       1963   .00137566
r65       1964   .00090207
r66       1965   .00058381
r67       1966   .00037486
r68       1967    .0002404
r69       1968   .00015518
r70       1969   .00010166
r71       1970    .0000681
r72       1971   .00017831

. drop _all

.
.
. * (1b) Compute ever-smoking prevalence by birth cohort from nir.dta
. * Note: 'nir.dta' excludes Insulator crossovers
. drop _all

. use "nir"

. keep coh Smok w

. tab coh [w=w], sum(Smok)
(analytic weights assumed)

            |            Summary of Smoked?
     cohort |        Mean   Std. Dev.       Freq.          Obs.
------------+----------------------------------------------------
      -1909 |   .65828276   .47546956      846463           201
    1910-19 |   .78556302   .41063019     5166357          1032
    1920-29 |   .79826907   .40141712    11307582          1609
    1930-39 |   .75219631   .43200298     7859782           813
    1940-   |    .7517905   .43243825     5989541           466
------------+----------------------------------------------------
      Total |   .77181249   .41971504    31169725          4121

.
. * Matrix E holds ever-smoking prevalence by cohort
```


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nqr7.log

```
. matrix E = (1880, 1909 \ 1910, 1919 \ 1920, 1929 \ 1930, 1939 \ 1940, 1971 )

. matrix E = E, J(5,1,0)

. matrix colnames E = t0 t1 Ever

.
. prog def setE
  1.   local i = 1
  2.   while `i' <= 5 {
  3.     qui sum Smok [w=w] if coh == `i'
  4.     matrix E[`i',3] = r(mean)
  5.     local i = `i' + 1
  6.   }
  7. end

. setE

. matrix li E

E[5,3]
          t0        t1      Ever
r1      1880      1909  .65828276
r2      1910      1919  .78556302
r3      1920      1929  .79826907
r4      1930      1939  .75219631
r5      1940      1971   .7517905

.
. * (1c) Compute conditional distribn of birth year pi() among ever smokers
.
. drop _all

. svmat pi
number of observations will be reset to 72
Press any key to continue, or Break to abort
obs was 0, now 72

. ren pi1 t

. ren pi2 pi

. qui gen pi_ = .

. form pi* %9.4f

.
. prog def getpi
  1.   local i = 1
  2.   while `i' <= 5 {
  3.     replace pi_ = pi*E[`i',3] if t >= E[`i',1] & t <= E[`i',2]
  4. *    Note:  In CF with pre-1988 misconduct, ever-smoking prevalence
. *     of 1940+ birth cohort will be reduced by 3.6%. (nir4.log).
. *     But this feedback effect is very small.
.     local i = `i' + 1
  5.   }
  6.   qui sum pi_
  7.   global sumPi = r(mean)*r(N)
  8.   qui replace pi_ = pi_/$sumPi
  9.   end

. getpi
(10 real changes made)
(10 real changes made)
(10 real changes made)
(10 real changes made)
(32 real changes made)

. * Replace pi_ in ?nd col of matrix pi()
. svmat pi_

. matrix pi = pi[1..$m,1..1]

. matrix pi = pi,pi_

.
. * (2) Compute Mean Years Smoked Among Persons Who Ever Smoked
.
. drop _all

. * Get L and SB from nqr4 output
. use nqr4

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * LSB is proportion who are still smoking and alive
. gen LSB = L*SB

. qui sum LSB

. * EB is mean smoke-years taking mortality into account
. global EB = r(mean)*$N

. di "Mean smoke-years (BL) = ",%9.2f $EB
Mean smoke-years (BL) =      45.43

. * LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
. gen LSBR1 = .
(82 missing values generated)

. gen LSBR2 = .
(82 missing values generated)

. gen LSBR3 = .
(82 missing values generated)

. gen SC = .
(82 missing values generated)

.
. prog def LSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
.   global T1 = $_1
  2.   global T2 = $_2
  3.   global T3 = $_3
  4.   global R1 = $_4
  5.   global R2 = $_5
  6.   global R3 = $_6
  7. * Check T3 > T2 > T1
.   if $T2 <= $T1 | $T3 <= $T2 {
  8.     di "Invalid ",%9.0f $T1,$T2,$T3
  9.     exit
 10.     }
```


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nqr7.log

```
 11. * Compute SB(x)^R1 and L(x)*SB(x)^R1
. * Compute SB(x)^R2 and L(x)*SB(x)^R2
. * Compute SB(x)^R3 and L(x)*SB(x)^R3
    qui replace LSBR1 = L*SB^SR1
 12.    qui replace LSBR2 = L*SB^SR2
 13.    qui replace LSBR3 = L*SB^SR3
 14.    qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
. * SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
. * Sum over index 'i' (rows of pi)
    local i = 1
 16.    while 'i' <= $m {
 17.      local t = pi['i',1]
 18. *    't' year of birth
      local u1 = $T1 - 't' - $xMin - 1
 19.      local v1 = 'u1' + 1
 20.      local u2 = $T2 - 't' - $xMin - 1
 21.      local v2 = 'u2' + 1
 22.      local u3 = min($T3 - 't' - $xMin - 1,$N)
 23.      local v3 = 'u3' + 1
 24. *    Compute intermediate 'areas'
      local A1 = SB['u1']^(1-$R1)
 25.      local A2 = SB['u2']^($R1-$R2)
 26.      local A3 = SB['u3']^($R2-$R3)
 27. *    'u3' > 'u2' > 'u1' required
. *    Case A:
      if 'u3' <= 0 {
 28.        qui replace SC = SC + pi['i',2] * LSBR3
 29.      }
 30.      else {
 31. *    Case B:
        if 'u3' > 0 & 'u2' <= 0 {
 32.          qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
 33.          if 'v3' <= $N {
 34.            qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
 35.          }
 36.        }
 37.        else {
 38. *    Case C:
          if 'u2' > 0 & 'u1' <= 0 {
 39.            qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
 40.            qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
 41.            if 'v3' <= $N {
 42.              qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/
> $N
 43.            }
 44.          }
 45.          else {
 46. *    Case D:
            qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
 47.            qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
 48.            qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u
> 3'
 49.            if 'v3' <= $N {
 50.              qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' i
> n 'v3'/$N
 51.            }
 52.          }
 53.        }
 54.      }
 55.      local i = 'i' + 1
 56.    }
 57.    qui sum SC
 58.    global EC = r(mean)*$N
 59.    di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB
> ,%8.2f $EC,%8.2f $EB - $EC
 60. end

. prog def rangeSC
  1. di "    T1      T2      T3      R1      R2      R3      XB      XC
> deltaX"
  2.
. LSC 1954 1963 2001 1.0 2.1 1.0
  3.    qui gen SC_lo = SC
  4.    lab var SC_lo "SC (R=1 post-2000) low est."
  5.    LSC 1954 1963 2001 1.0 2.1 2.1
  6.    LSC 1954 1963 2001 1.0 2.4 1.0
  7.    LSC 1954 1963 2001 1.0 3.0 1.0
  8.    LSC 1954 1963 2001 1.0 3.6 1.0
  9.
. LSC 1954 1963 2001 1.5 2.4 1.0
 10.
. *****Wecker Change: change 3.0 to 1.0******
.
. LSC 1954 1963 2001 1.5 3.0 1.0
    LSC 1954 1963 2001 1.5 1.0 1.0
 11.
. **************End Wecker Change************
.
. qui gen SC_ = SC
 12.    lab var SC_ "SC (R=1 post-2000) middle est."
 13.    LSC 1954 1963 2001 1.5 3.0 3.0
 14.    qui gen SC3 = SC
 15.    lab var SC3 "SC (R=3 post-2000) middle est."
 16.
. LSC 1954 1963 2001 1.5 3.6 1.0
 17.    LSC 1954 1963 2001 2.0 2.4 1.0
 18.    LSC 1954 1963 2001 2.0 3.0 1.0
 19.    LSC 1954 1963 2001 2.0 3.6 1.0
 20.    LSC 1954 1963 2001 2.0 3.9 1.0
 21.    qui gen SC_hi = SC
 22.    lab var SC_hi "SC (R=1 post-2000) high est."
 23.    LSC 1954 1963 2001 2.0 3.9 3.9
 24.
. LSC 1954 1963 1999 1.5 3.0 1.0
 25.    LSC 1954 1963 2000 1.5 3.0 1.0
 26.
.
. end

.
. rangeSC
```

T1	T2	T3	R1	R2	R3	XB	XC	deltaX
1954	1963	2001	1.0	2.1	1.0	45.43	37.06	8.37
1954	1963	2001	1.0	2.1	2.1	45.43	34.47	10.96
1954	1963	2001	1.0	2.4	1.0	45.43	35.34	10.09
1954	1963	2001	1.0	3.0	1.0	45.43	32.42	13.01
1954	1963	2001	1.0	3.6	1.0	45.43	30.03	15.40
1954	1963	2001	1.5	2.4	1.0	45.43	35.12	10.31
1954	1963	2001	1.5	1.0	1.0	45.43	45.11	0.32
1954	1963	2001	1.5	3.0	3.0	45.43	29.53	15.90
1954	1963	2001	1.5	3.6	1.0	45.43	29.85	15.58
1954	1963	2001	2.0	2.4	1.0	45.43	34.90	10.52
1954	1963	2001	2.0	3.0	1.0	45.43	32.03	13.40
1954	1963	2001	2.0	3.6	1.0	45.43	29.68	15.75
1954	1963	2001	2.0	3.9	1.0	45.43	28.65	16.77
1954	1963	2001	2.0	3.9	3.9	45.43	26.30	19.13
1954	1963	1999	1.5	3.0	1.0	45.43	32.75	12.68

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nqr7.log

```
 1954    1963    2000     1.5     3.0     1.0    45.43    32.48    12.95

. gr SC_ LSB x if x<=75,ylab(0,.25,.5,[illegible]xlab([illegible]0,40,[illegible]0)s(ii)c(JJ)l1
> ("Proportion Still Alive and Smoking")saving(nqr7a,replace)

. gr SC_ SC3 LSB x if x<=75,ylab(0,.25,[illegible],.75,1)xlab(20,30,40,50,60,70)s(iii)c(
> JJJ)l1("Proportion Still Alive and Smoking")saving(nqr7b,replace)

. form LSB SC* %7.3f

. form x %6.0f

. keep x LSB SC_*

. l, nod
```

	x	LSB	SC_lo	SC_	SC_hi
1.	17	1.000	1.000	1.000	1.000
2.	18	1.000	1.000	1.000	1.000
3.	19	0.999	0.998	0.998	0.996
4.	20	0.994	0.990	0.993	0.983
5.	21	0.990	0.984	0.989	0.972
6.	22	0.977	0.962	0.974	0.933
7.	23	0.973	0.956	0.971	0.922
8.	24	0.967	0.945	0.964	0.903
9.	25	0.963	0.937	0.959	0.890
10.	26	0.959	0.930	0.955	0.879
11.	27	0.954	0.922	0.950	0.865
12.	28	0.951	0.917	0.947	0.856
13.	29	0.946	0.908	0.941	0.841
14.	30	0.939	0.895	0.934	0.818
15.	31	0.934	0.886	0.928	0.803
16.	32	0.925	0.869	0.919	0.776
17.	33	0.922	0.863	0.915	0.765
18.	34	0.910	0.842	0.904	0.731
19.	35	0.900	0.823	0.893	0.701
20.	36	0.895	0.814	0.888	0.688
21.	37	0.891	0.806	0.884	0.675
22.	38	0.883	0.792	0.876	0.654
23.	39	0.873	0.773	0.865	0.625
24.	40	0.859	0.749	0.852	0.590
25.	41	0.852	0.736	0.844	0.571
26.	42	0.835	0.708	0.828	0.531
27.	43	0.822	0.685	0.814	0.500
28.	44	0.810	0.665	0.803	0.475
29.	45	0.791	0.634	0.784	0.435
30.	46	0.776	0.611	0.768	0.407
31.	47	0.760	0.587	0.753	0.379
32.	48	0.742	0.560	0.735	0.349
33.	49	0.730	0.544	0.723	0.332
34.	50	0.706	0.512	0.699	0.299
35.	51	0.695	0.499	0.689	0.287
36.	52	0.678	0.479	0.672	0.268
37.	53	0.659	0.457	0.653	0.250
38.	54	0.642	0.437	0.635	0.233
39.	55	0.618	0.413	0.613	0.214
40.	56	0.596	0.392	0.590	0.199
41.	57	0.573	0.370	0.568	0.184
42.	58	0.559	0.357	0.553	0.175
43.	59	0.536	0.338	0.530	0.163
44.	60	0.510	0.317	0.505	0.151
45.	61	0.492	0.303	0.487	0.143
46.	62	0.473	0.288	0.468	0.135
47.	63	0.448	0.269	0.443	0.125
48.	64	0.428	0.256	0.424	0.118
[illegible]	65	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	66	[illegible]	[illegible]	[illegible]	[illegible]105
[illegible]	67	[illegible]	[illegible]	[illegible]70	[illegible]100
[illegible]	[illegible]	[illegible]5	[illegible]	[illegible]	[illegible]095
53.	69	0.335	[illegible]	0.331	0.089
54.	70	0.316	0.182	0.313	0.083
55.	71	0.299	0.172	0.296	0.078
56.	72	0.285	0.163	0.282	0.075
[illegible]	73	0.273	0.156	0.271	0.071
[illegible]	74	0.260	0.149	0.258	0.068
[illegible]	75	0.250	0.143	0.247	0.065
60.	76	0.236	0.134	0.233	0.061
61.	77	0.222	0.127	0.220	0.058
62.	78	0.213	0.121	0.211	0.055
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.053
[illegible]	[illegible]	[illegible]	0.109	[illegible]189	0.050
65.	[illegible]	[illegible]76	[illegible]100	[illegible]174	0.046
66.	[illegible]	[illegible]	[illegible]	[illegible]165	0.043
67.	[illegible]	0.161	0.092	0.160	0.042
68.	84	0.159	0.091	0.158	0.042
69.	85	0.158	0.090	0.156	0.041
70.	86	0.157	0.089	0.155	0.041
71.	87	0.149	0.085	0.148	0.039
72.	88	0.141	0.081	0.140	0.037
73.	89	0.127	0.072	0.125	0.033
74.	90	0.126	0.072	0.125	0.033
75.	91	0.126	0.072	0.125	0.033
76.	92	0.126	0.072	0.125	0.033
77.	93	0.126	0.072	0.125	0.033
78.	94	0.117	0.067	0.116	0.030
79.	95	0.117	0.067	0.116	0.030
80.	96	0.117	0.067	0.116	0.030
81.	97	0.117	0.067	0.116	0.030
82.	98	0.117	0.067	0.116	0.030

```
. save nqr7_R2, replace
file nqr7_R2.dta saved

.
.
. log close
```


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nqr8_R2.do

```
 @RM500
 nqr8: BL-CF differences in mean smoke-years exposure
 based upon empirical smoke-survival curve and mortality
 of claimants in HRA audit files
 Relative risk quitting model hC(t) = R1*hB(t) if T2 > year >= T1
 hC(t) = R2*hB(t) if T3 > year >= T2, where T2 > T1
 hC(t) = R3*hB(t) if year >= T3, where T3 > T2
 (R3 can be any value, not just 1; T3 can be any value, not just 1999)
 Scenario     pre-88 misconduct     Estimate     R1     R2     R3
    BL              -                  -         1.0    1.0    1.0
    CF             yes                low        1.0    2.1    1.0
    CF             yes                mid        1.5    3.0    1.0
    CF             yes                high       2.0    3.9    1.0

* Input files: nqr, nqr4
clear
prog drop _all
set matsize 800
set rmsg off
set more off

log using nqr8, replace

* Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
* Relative increase in quit rate (on or after year T1) is global variable $R1
* Relative increase in quit rate (on or after year T2) is global variable $R2
* Relative increase in quit rate (on or after year T3) is global variable $R3
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)


* (1) Conditional distribn of birth year pi() among "past" ever smokers

use nqr
* Save distribution of yrborn in Matrix pi(t)
qui tab yrborn [w=w], matcell(pi) matrow(t_)
matrix pi = pi/_result(1)
matrix pi = t_, pi
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix drop t_
*matrix list pi

* (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

drop _all
* Get L and SB from nqr4 output
use nqr4
qui sum x
global xMin = r(min)
global N = _N

* LSB is proportion who are still smoking and alive
gen LSB = L*SB
qui sum LSB
* EB is mean smoke-years taking mortality into account
global EB = r(mean)*$N
di "Mean smoke-years (BL) = ",%9.2f $EB
* LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
gen LSBR1 = .
gen LSBR2 = .
gen LSBR3 = .
gen SC = .

prog def LSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global R1 = $_4
  global R2 = $_5
  global R3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
  }
* Compute SB(x)^R1 and L(x)*SB(x)^R1
* Compute SB(x)^R2 and L(x)*SB(x)^R2
* Compute SB(x)^R3 and L(x)*SB(x)^R3
  qui replace LSBR1 = L*SB^$R1
  qui replace LSBR2 = L*SB^$R2
  qui replace LSBR3 = L*SB^$R3
  qui replace SC = 0
* Compute SC = SUM(i) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
* SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
*   't' year of birth
    local u1 = $T1 - 't' - $xMin - 1
    local v1 = 'u1' + 1
    local u2 = $T2 - 't' - $xMin - 1
    local v2 = 'u2' + 1
    local u3 = min($T3 - 't' - $xMin - 1,$N)
    local v3 = 'u3' + 1
*   Compute intermediate 'areas'
    local A1 = SB['u1']^(1-$R1)
    local A2 = SB['u2']^($R1-$R2)
    local A3 = SB['u3']^($R2-$R3)
*   'u3' > 'u2' > 'u1' required
*   Case A:
    if 'u3' <= 0 {
      qui replace SC = SC + pi['i',2] * LSBR3
    }
    else {
*   Case B:
      if 'u3' > 0 & 'u2' <= 0 {
        qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
        if 'v3' <= $N {
          qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
        }
      }
      else {
*   Case C:
        if 'u2' > 0 & 'u1' <= 0 {
          qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
          qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
          if 'v3' <= $N {
            qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/$N
          }
        }
        else {
*   Case D:
          qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
          qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
          qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u3'
          if 'v3' <= $N {
```

nqr8_R2.do

```
          qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' in 'v3'/$N
        }
      }
    }
   }
   local i = 'i' + 1
  }
  qui sum SC
  global EC = r(mean)*$N
  di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB,%8.2f $EC,%8.
2f $EB - $EC
end

prog def rangeSC
  di "     T1       T2      T3       R1       R2       R3       XB       XC   deltaX"

  LSC 1954 1963 2001 1.0 2.1 1.0
  qui gen SC_lo = SC
  lab var SC_lo "SC (R=1 post-2000) low est."
  LSC 1954 1963 2001 1.0 2.1 2.1
  LSC 1954 1963 2001 1.0 2.4 1.0
  LSC 1954 1963 2001 1.0 3.0 1.0
  LSC 1954 1963 2001 1.0 3.6 1.0

  LSC 1954 1963 2001 1.5 2.4 1.0

  ******Wecker Change: change 3.0 to 1.0******

  *LSC 1954 1963 2001 1.5 3.0 1.0
   LSC 1954 1963 2001 1.5 1.0 1.0

  *************End Wecker Change************

  qui gen SC_ = SC
  lab var SC_ "SC (R=1 post-2000) middle est."
  LSC 1954 1963 2001 1.5 3.0 3.0
  qui gen SC3 = SC
  lab var SC3 "SC (R=3 post-2000) middle est."

  LSC 1954 1963 2001 1.5 3.6 1.0
  LSC 1954 1963 2001 2.0 2.4 1.0
  LSC 1954 1963 2001 2.0 3.0 1.0
  LSC 1954 1963 2001 2.0 3.6 1.0
  LSC 1954 1963 2001 2.0 3.9 1.0
  qui gen SC_hi = SC
  lab var SC_hi "SC (R=1 post-2000) high est."
  LSC 1954 1963 2001 2.0 3.9 3.9

  LSC 1954 1963 1999 1.5 3.0 1.0
  LSC 1954 1963 2000 1.5 3.0 1.0

end

rangeSC

gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1("Proportio
n Still Alive and Smoking")saving(nqr8a,replace)
gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(JJJ)l1("Pro
portion Still Alive and Smoking")saving(nqr8b,replace)
```

```
1, nod
save nqr8_R2, replace

log close
\032
```

nqr8.log

```
. * Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
. * Relative increase in quit rate (on or after year T1) is global variable $R1
. * Relative increase in quit rate (on or after year T2) is global variable $R2
. * Relative increase in quit rate (on or after year T3) is global variable $R3
. * (R3 can be any value, not just 1; T3 can be any value, not just 1999)

. * (1) Conditional distribn of birth year pi() among "past" ever smokers

. use nqr

. * Save distribution of yrborn in Matrix pi(t)
. qui tab yrborn [w=w], matcell(pi) matrow(t_)

. matrix pi = pi/_result(1)

. matrix pi = t_, pi

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix drop t_

. *matrix list pi

. * (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

. drop _all

. * Get L and SB from nqr4 output
. use nqr4

. qui sum x

. global xMin = r(min)

. global N = _N

. * LSB is proportion who are still smoking and alive
. gen LSB = L*SB

. qui sum LSB

. * EB is mean smoke-years taking mortality into account
. global EB = r(mean)*$N

. di "Mean smoke-years (BL) = ",%9.2f $EB
Mean smoke-years (BL) =       45.43

. * LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
. gen LSBR1 = .
(82 missing values generated)

. gen LSBR2 = .
(82 missing values generated)

. gen LSBR3 = .
(82 missing values generated)

. gen SC = .
(82 missing values generated)

. program def ESC
  1.   $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
. global T1 = $_1
  2.   global T2 = $_2
  3.   global T3 = $_3
  4.   global R1 = $_4
  5.   global R2 = $_5
  6.   global R3 = $_6
  7.   Check T3 > T2 > T1
. if $T2 <= $T1 | $T3 <= $T2 {
  8.     di "Invalid ",%9.0f $T1,$T2,$T3
  9.     exit
 10.   }
 11.   Compute SB(x)^R1 and L(x)*SB(x)^R1
. * Compute SB(x)^R2 and L(x)*SB(x)^R2
. * Compute SB(x)^R3 and L(x)*SB(x)^R3
.   qui replace LSBR1 = L*SB^$R1
 12.   qui replace LSBR2 = L*SB^$R2
 13.   qui replace LSBR3 = L*SB^$R3
 14.   qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
. * SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
. * Sum over index 'i' (rows of pi)
.   local i = 1
 16.   while 'i' <= $m {
 17.     local t = pi['i',1]
 18. *     't' year of birth
.     local u1 = $T1 - 't' - $xMin - 1
 19.     local v1 = 'u1' + 1
 20.     local u2 = $T2 - 't' - $xMin - 1
 21.     local v2 = 'u2' + 1
 22.     local u3 = min($T3 - 't' - $xMin - 1,$N)
 23.     local v3 = 'u3' + 1
 24. *   Compute intermediate 'areas'
.     local A1 = SB['u1']^(1-$R1)
 25.     local A2 = SB['u2']^($R1-$R2)
 26.     local A3 = SB['u3']^($R2-$R3)
 27. *   'u3' > 'u2' > 'u1' required
. *   Case A:
.     if 'u3' <= 0 {
 28.       qui replace SC = SC + pi['i',2] * LSBR3
 29.     }
 30.     else {
 31. *   Case B:
.      if 'u3' > 0 & 'u2' <= 0 {
 32.        qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
 33.        if 'v3' <= $N {
 34.          qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
 35.        }
 36.      }
 37.      else {
 38. *   Case C:
.       if 'u2' > 0 & 'u1' <= 0 {
 39.          qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
 40.          qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
 41.          if 'v3' <= $N {
 42.            qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/
> $N
 43.          }
 44.        }
 45.        else {
```

nqr8.log

```
46. *   Case D:
        qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
47.       qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
48.       qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'u2'/'u
. 3'
49.       if 'v3' <= $N {
50.         qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' * 1
> n 'v3'/$N
51.         }
52.       }
53.     }
54.   }
55.   local i = 'i' + 1
56.   }
57.   qui sum SC
58.   global EC = r(mean)*$N
59.   di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB
> ,%8.2f $EC,%8.2f $EB - $EC
60. end

. prog def rangeSC
  1.   di "      T1       T2       T3       R1       R2       R3       XB       XC
>      deltaX"
  2.
  LSC 1954 1963 2001 1.0 2.1 1.0
  3.   qui gen SC_lo = SC
  4.   lab var SC_lo "SC (R=1 post-2000) low est."
  5.   LSC 1954 1963 2001 1.0 2.1 2.1
  6.   LSC 1954 1963 2001 1.0 2.4 1.0
  7.   LSC 1954 1963 2001 1.0 3.0 1.0
  8.   LSC 1954 1963 2001 1.0 3.6 1.0
  9.
  LSC 1954 1963 2001 1.5 2.4 1.0
 10.
  ******Wecker Change: change 3.0 to 1.0******

  *LSC 1954 1963 2001 1.5 3.0 1.0
   LSC 1954 1963 2001 1.5 1.0 1.0
 11.
  **************End Wecker Change************

  qui gen SC_ = SC
 12.   lab var SC_ "SC (R=1 post-2000) middle est."
 13.   LSC 1954 1963 2001 1.5 3.0 3.0
 14.   qui gen SC3 = SC
 15.   lab var SC3 "SC (R=3 post-2000) middle est."
 16.
  LSC 1954 1963 2001 1.5 3.6 1.0
 17.   LSC 1954 1963 2001 2.0 2.4 1.0
 18.   LSC 1954 1963 2001 2.0 3.0 1.0
 19.   LSC 1954 1963 2001 2.0 3.6 1.0
 20.   LSC 1954 1963 2001 2.0 3.9 1.0
 21.   qui gen SC_hi = SC
 22.   lab var SC_hi "SC (R=1 post-2000) high est."
 23.   LSC 1954 1963 2001 2.0 3.9 3.9
 24.
  LSC 1954 1963 1999 1.5 3.0 1.0
 25.   LSC 1954 1963 2000 1.5 3.0 1.0
 26.
.
. end
```

remove asterisk - specify quit rate effect (past)

```
. rangeSC
```

T1	T2	T3	R1	R2	R3	XB	XC	deltaX
1954	1963	2001	1.0	2.1	1.0	45.43	37.02	8.41
1954	1963	2001	1.0	2.1	2.1	45.43	36.18	9.25
1954	1963	2001	1.0	2.4	1.0	45.43	35.49	9.94
1954	1963	2001	1.0	3.0	1.0	45.43	33.02	12.41
1954	1963	2001	1.0	3.6	1.0	45.43	31.13	14.30
1954	1963	2001	1.5	2.4	1.0	45.43	34.94	10.49
1954	1963	2001	1.5	1.0	1.0	45.43	44.61	0.81
1954	1963	2001	1.5	3.0	3.0	45.43	31.75	13.67
1954	1963	2001	1.5	3.6	1.0	45.43	30.69	14.74
1954	1963	2001	2.0	2.4	1.0	45.43	34.42	11.01
1954	1963	2001	2.0	3.0	1.0	45.43	32.07	13.36
1954	1963	2001	2.0	3.6	1.0	45.43	30.27	15.16
1954	1963	2001	2.0	3.9	1.0	45.43	29.52	15.91
1954	1963	2001	2.0	3.9	3.9	45.43	28.91	16.51
1954	1963	1999	1.5	3.0	1.0	45.43	32.75	12.68
1954	1963	2000	1.5	3.0	1.0	45.43	32.64	12.79

```
. gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1
> ("Proportion Still Alive and Smoking")saving(nqr8a,replace)

. gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(
> JJJ)l1("Proportion Still Alive and Smoking")saving(nqr8b,replace)

.
. form LSB SC* %7.3f

. form x %6.0f

. keep x LSB SC_*

. l, nod
```

	x	LSB	SC_lo	SC_	SC_hi
1.	17	1.000	1.000	1.000	1.000
2.	18	1.000	1.000	1.000	1.000
3.	19	0.999	0.998	0.998	0.998
4.	20	0.994	0.993	0.993	0.990
5.	21	0.990	0.988	0.989	0.984
6.	22	0.977	0.973	0.975	0.961
7.	23	0.973	0.968	0.971	0.955
8.	24	0.967	0.960	0.964	0.943
9.	25	0.963	0.955	0.959	0.935
10.	26	0.959	0.950	0.954	0.927
11.	27	0.954	0.944	0.949	0.918
12.	28	0.951	0.940	0.946	0.912
13.	29	0.946	0.933	0.940	0.901
14.	30	0.939	0.923	0.932	0.885
15.	31	0.934	0.916	0.926	0.873
16.	32	0.925	0.903	0.915	0.852
17.	33	0.922	0.898	0.911	0.844
18.	34	0.910	0.881	0.898	0.816
19.	35	0.900	0.865	0.886	0.790
20.	36	0.895	0.858	0.881	0.778
21.	37	0.891	0.851	0.876	0.767
22.	38	0.883	0.838	0.868	0.747
23.	39	0.873	0.821	0.856	0.718
24.	40	0.859	0.798	0.842	0.683
25.	41	0.852	0.786	0.834	0.664
26.	42	0.835	0.758	0.816	0.622
27.	43	0.822	0.735	0.802	0.588
28.	44	0.810	0.715	0.790	0.559
29.	45	0.791	0.682	0.771	0.513

nqr8.log

30.	46	0.776	0.657	0.755	0.480
31.	47	0.760	0.631	0.739	0.445
32.	48	0.742	0.601	0.721	0.407
33.	49	0.730	0.582	0.709	0.385
34.	50	0.706	0.545	0.685	[illegible]
35.	51	0.695	0.529	0.675	[illegible]
36.	52	0.678	0.505	0.659	[illegible]
37.	53	0.659	0.478	0.640	0.270
38.	54	0.642	0.453	0.623	0.245
39.	55	0.618	0.422	0.600	0.216
40.	56	0.596	0.394	0.578	0.192
41.	57	0.573	0.366	0.556	0.168
42.	58	0.559	0.349	0.542	0.155
43.	59	0.536	0.324	0.520	0.137
44.	60	0.510	0.297	0.495	0.118
45.	61	0.492	0.279	0.478	0.107
46.	62	0.473	0.261	0.459	0.096
47.	63	0.448	0.238	0.434	0.083
48.	64	0.428	0.221	0.416	0.074
49.	65	0.411	0.207	0.399	0.067
50.	66	0.390	0.191	0.378	0.060
51.	67	0.374	0.179	0.363	0.055
52.	68	0.355	0.166	0.345	0.049
53.	69	0.335	0.152	0.325	0.044
54.	70	0.316	0.141	0.307	0.040
55.	71	0.299	0.130	0.290	0.036
56.	72	0.285	0.122	0.276	0.034
57.	73	0.273	0.116	0.265	0.032
58.	74	0.260	0.109	0.252	0.030
59.	75	0.250	0.104	0.242	0.028
60.	76	0.236	0.097	0.229	0.026
61.	77	0.222	0.091	0.216	0.024
62.	78	0.213	0.087	0.207	0.023
63.	79	0.203	0.083	0.197	0.022
64.	80	0.191	0.078	0.186	0.021
65.	81	0.176	0.071	0.171	0.019
66.	82	0.167	0.068	0.162	0.018
67.	83	0.161	0.065	0.157	0.017
68.	84	0.159	0.065	0.155	0.017
69.	85	0.158	0.064	0.153	0.017
70.	86	0.157	0.063	0.152	0.017
71.	87	0.149	0.060	0.145	0.016
72.	88	0.141	0.057	0.137	0.015
73.	89	0.127	0.051	0.123	0.014
74.	90	0.126	0.051	0.123	0.014
75.	91	0.126	0.051	0.123	0.014
76.	92	0.126	0.051	0.123	0.014
77.	93	0.126	0.051	0.123	0.014
78.	94	0.117	0.047	0.113	0.013
79.	95	0.117	0.047	0.113	0.013
80.	96	0.117	0.047	0.113	0.013
81.	97	0.117	0.047	0.113	0.013
82.	98	0.117	0.047	0.113	0.013

. save nqr8_R2, replace

ndx4_R2_r2.do

```
* @RM500
* ndx4:  Combines output of nqr8 (quit-rate effect) and nir6 (initiation-rate) effect
* to estimate delta X (change in mean lifetime years of smoking) for past claimants
* Produces low, med, and high estimates for CF scenario without post 2000 misconduct

clear
prog drop _all
set matsize 500
set rmsg off
set more off

log using ndx4, replace
* Future claimants: Effects of decreased initiation
use nir6_r2
* Compute frequency distributions
prog def Freq
 qui gen f$_1 = F$_1 - F$_1[_n-1]
end

Freq B
Freq C_lo
Freq C_
Freq C_hi
drop F*
drop in 1
form f* %7.3f
form x %6.0f

* Combine with results on Past Claimants: Effect of Increase Quit Rates
merge x using nqr8_R2
ren LSB SB
* Reverse sort order to compute conditional means
gen byte n = _N - _n
sort n
drop n

* Compute conditional means
prog def CondMean
 qui replace S$_1 = S$_1[_n-1] if S$_1 == .
 qui gen m$_1 = sum(S$_1)
 qui replace m$_1 = m$_1/S$_1
end

CondMean B
CondMean C_lo
CondMean C_
CondMean C_hi
keep x f* m*
form m* %7.3f
sort x
drop if fB == .

* Compute Mean Years Smoked (X)
prog def mX
 qui gen s$_1 = f$_1 * m$_1
 qui sum s$_1
 global X$_1 = r(mean)*r(N)
 drop s$_1
end

mX B
mX C_lo
mX C_
mX C_hi
* Baseline scenario: Mean Years Smoked
di %9.1f $XB
prog def Results
 di "---      Decrease in mean years smoked      ---"
 di "Post-2000        Low         Middle        High"
 di "Misconduct       Est.        Est.          Est."
 di "No   ",%12.1f $XB - $XC_lo,%12.1f $XB - $XC_,%12.1f $XB - $XC_hi
end
Results

* Convert results to matrix & save
* matrix def dX = J(2,3,0)
matrix def dX = J(1,3,0)
matrix dX[1,1] = $XB - $XC_lo
matrix dX[1,2] = $XB - $XC_
matrix dX[1,3] = $XB - $XC_hi
drop _all
svmat dX
gen byte Scenario = _n
lab def Scenario 1"No-Post2000" 2"Post2000"
lab val Scenario Scenario
ren dX1 dX_lo
ren dX2 dX
ren dX3 dX_hi
gen byte Era = 1
lab def Era 1"Past" 2"Future"
lab val Era Era
order Era Scenario dX_lo dX dX_hi
form dX* %9.2f
save ndx4_R2_r2, replace
1
log close

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```

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ndx4.log


```
. * Future claimants: Effects of decreased initiation
. use nir6_r2

. * Compute frequency distributions
. prog def Freq
  1.  qui gen f$_1 = F$_1 - F$_1[_n-1]
  2. end

. Freq B

. Freq C_lo

. Freq C_

. Freq C_hi

. drop F*

. drop in 1
(1 observation deleted)

. form f* %7.3f

. form x %6.0f

. * Combine with results on Past Claimants: Effect of Increase Quit Rates
. merge x using ngr8_R2

. ren LSB SB

. * Reverse sort order to compute conditional means
. gen byte n = _N - _n

. sort n

. drop n

. * Compute conditional means
. prog def CondMean
  1.  qui replace S$_1 = S$_1[_n-1] if S$_1 == .
  2.  qui gen m$_1 = sum(S$_1)
  3.  qui replace m$_1 = m$_1/S$_1
  4. end

. CondMean B

. CondMean C_lo

. CondMean C_

. CondMean C_hi

. keep x f* m*

. form m* %7.3f

. sort x

. drop if fB == .
(48 observations deleted)
```

```
. * Compute Mean Years Smoked (X)
. prog def mX
  1.  qui gen s$_1 = S$_1 * m$_1
  2.  qui sum s$_1
  3.  global X$_1 = r(mean)/r(N)
  4.  drop s$_1
  5. end

. mX B

. mX C_lo

. mX C_

. mX C_hi

. * Baseline scenario: Mean Years Smoked
. di %9.1f $XB
    32.2

. prog def Results
  1.  di "---       Decrease in mean years smoked      ---"
  2.  di "Post-2000        Low        Middle        High"
  3.  di "Misconduct       Est.       Est.          Est."
  4.  di " No     ",%12.1f $XB - $XC_lo,%12.1f $XB - $XC_,%12.1f $XB - $XC_hi
  5. end

. Results
---       Decrease in mean years smoked      ---
Post-2000        Low        Middle        High
Misconduct       Est.       Est.          Est.
 No              6.9         0.9          13.3

.
. * Convert results to matrix & save
. * matrix def dX = J(2,3,0)
. matrix def dX = J(1,3,0)

. matrix dX[1,1] = $XB - $XC_lo

. matrix dX[1,2] = $XB - $XC_

. matrix dX[1,3] = $XB - $XC_hi

. drop _all

. svmat dX
number of observations will be reset to 1
Press any key to continue, or Break to abort
obs was 0, now 1

. gen byte Scenario = _n

. lab def Scenario 1"No-Post2000" 2"Post2000"

. lab val Scenario Scenario

. ren dX1 dX_lo

. ren dX2 dX
```

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```
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. ren dX3 dX_hi

. gen byte Era = 1

. lab def Era 1"Past" 2"Future"

. lab val Era Era

. order Era Scenario dX_lo dX dX_hi

. form dX* %9.2f

. save ndx4_R2_r2, replace
file ndx4_R2_r2.dta saved

. l

       Era      Scenario     dX_lo      dX     dX_hi
  1.   Past  No Post2000      6.86    0.90     13.2
. log close
```


c.f. Harris's reduction in mean smokyrs of 10.65

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```
/* LIMDEP 7.0 source code:
   Multivariate normal analysis of:
     1. cumulative incidence of Lung Cancer (diedLC);
     2. prevalence of parenchymal disease (by ILO profusion
        score on X-ray) (Par);
     3. abnormal pulmonary function by spirometric
        determination of FVC) (PFT); and
     4. Pleural injury (anyPleu)
   This 'main' version assumes that there no relationship between
   smoking and pleural injury.
   Exposure results based upon assumption of no misconduct post-2000.
 */

/* Restrict analysis to main sample (2,243) rather than
   extended sample (2,609) */
reject; new; w = 0 $
skip

/* RHS variables (including years smoked, age categories, and
   categories of post-latency asbestos exposure as 'X' */
namelist; X = one, smokYrs, ageG*, T10_* $

 * Separate namelist with years smoked dropped for pleural disease
   dose-response models only */
namelist; Xo = one, ageG*, T10_* $

/* Descriptive statistics (sample means) of RHS variables */
dstat; rhs = X $

/* Save sample mean values of X's (and constant) in X_BL,
   which corresponds to baseline scenario (BL) */
matrix; Xmeans = part(LastDsta, 1, 7, 1, 1) $
 * Append 1 to vector of sample means */
matrix; u = [1] $
matrix; X_BL = [u / Xmeans] $

 * Construct conformal vector for Xo_BL */
dstat; rhs = Xo $
matrix; Xomeans = part(LastDsta, 1, 6, 1, 1) $
matrix; Xo_BL = [u / Xomeans] $

/* Univariate models: Show marginal effects.
   Note: LIMDEP computes partial derivatives dF/dXi, while
   Stata by default shows discrete effects deltaF/deltaXi. */

probit; lhs = diedLC; rhs = X; marginal effects $
matrix; b_LC = B $

probit; lhs = Par; rhs = X; marginal effects $
matrix; b_Par = B $

probit; lhs = PFT; rhs = X; marginal effects $
matrix; b_PFT = B $

/* Note change in RHS for anyPleu */
probit; lhs = anyPleu; rhs = Xo; marginal effects $
matrix; b_Ple = B $

/* Pairwise Bivariate probit models */

bivariate; lhs = diedLC, Par; rh1 = X; rh2 = X;
        start = b_LC, b_Par; marginal effects $
matrix; b_LC = part(B, 1, 8) $
calc; rhoLCPar = rho $

bivariate; lhs = Par, PFT; rh1 = X; rh2 = X;
        start = b_Par, b_PFT; marginal effects $
matrix; b_Par = part(B, 1, 8); b_PFT = part(B, 9, 16) $
calc; rhoParPF = rho

bivariate; lhs = diedLC, PFT; rh1 = X; rh2 = X;
        start = b_LC, b_PFT; marginal effects $
calc; rhoLCPFT = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = diedLC, anyPleu; rh1 = X; rh2 = Xo;
        start = b_LC, b_Ple; marginal effects $
calc; rhoLCPle = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = Par, anyPleu; rh1 = X; rh2 = Xo;
        start = b_Par, b_Ple; marginal effects $
/* Note change in dimension of b_Ple */
matrix; b_Ple = part(B, 9, 15) $
calc; rhoParPl = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = PFT, anyPleu; rh1 = X; rh2 = Xo;
        start = b_PFT, b_Ple; marginal effects $
calc; rhoPFTPl = rho $


/* 4x4 Variance-covariance matrix for multivariate
   normal calculations */
matrix; Omega4 = [1 /
                  rhoLCPar, 1/
                  rhoLCPFT, rhoParPF, 1/
                  rhoLCPle, rhoParPl, rhoPFTPl, 1] $

/* 3x3 Variance-covariance submatrix for multivariate
   normal calculations */
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $

/* Computation of indices XB at (baseline) means of X
   from probit models */
matrix; y_LC = X_BL'b_LC $
matrix; y_Par = X_BL'b_Par $
matrix; y_PFT = X_BL'b_PFT $
/* Note change in code for pleural */
matrix; y_Ple = Xo_BL'b_Ple $

/* Counterfactual values of indices (past) - no post-2000 misconduct */
matrix; y_LC_p   = y_LC - 0.90*Part(b_LC,2,2,1,1) $
matrix; y_LC_pHi = y_LC - 0.90*Part(b_LC,2,2,1,1) $
matrix; y_LC_pLo = y_LC - 0.90*Part(B_LC,2,2,1,1) $

matrix; y_Pa_p   = y_Par - 0.90*Part(b_Par,2,2,1,1) $
matrix; y_Pa_pHi = y_Par - 0.90*Part(b_Par,2,2,1,1) $
matrix; y_Pa_pLo = y_Par - 0.90*Part(b_Par,2,2,1,1) $

matrix; y_PF_p   = y_PFT - 0.90*Part(b_PFT,2,2,1,1) $
matrix; y_PF_pHi = y_PFT - 0.90*Part(b_PFT,2,2,1,1) $
matrix; y_PF_pLo = y_PFT - 0.90*Part(b_PFT,2,2,1,1) $

/* Note change in code for pleural disease */
matrix; y_Pl_p   = y_Ple $
matrix; y_Pl_pHi = y_Ple $
matrix; y_Pl_pLo = y_Ple $

/* Counterfactual values of indices (future) - no post-2000 misconduct */
```

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```
matrix; y_LC_f   = y_LC - 12.08*Part(b_LC,2,2,1,1) $
matrix; y_LC_fHi = y_LC - 12.08*Part(b_LC,2,2,1,1) $
matrix; y_LC_fLo = y_LC -12.08*Part(b_LC,2,2,1,1) $

matrix; y_Pa_f   = y_Par - 12.08*Part(b_Par,2,2,1,1) $
matrix; y_Pa_fHi = y_Par - 12.08*Part(b_Par,2,2,1,1) $
matrix; y_Pa_fLo = y_Par - 12.08*Part(b_Par,2,2,1,1) $

matrix; y_PF_f   = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $
matrix; y_PF_fHi = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $
matrix; y_PF_fLo = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $

/* Note change in code for pleural disease */
matrix; y_Pl_f   = y_Ple  $
matrix; y_Pl_fHi = y_Ple  $
matrix; y_Pl_fLo = y_Ple  $

/* Probability of still getting LC (p11) */
calc; p_LC = phi(y_LC) $
calc; p11_p = phi(y_LC_p)/p_LC $
calc; p11_pLo = phi(y_LC_pLo)/p_LC $
calc; p11_pHi = phi(y_LC_pHi)/p_LC $
calc; p11_f = phi(y_LC_f)/p_LC $
calc; p11_fLo = phi(y_LC_fLo)/p_LC $
calc; p11_fHi = phi(y_LC_fHi)/p_LC $

/* Probability of not getting LC but instead getting
   Disabling BID (Par and PFT) (p21); as well as
   Probability of not getting LC but instead getting
   Non-disabling BID (Par and not PFT) (p31) */

/* Use Greene's sign convention matrix (page 229)*/
matrix; T = [1,0,0/0,1,0/0,0,-1] $
matrix; Omega3A = T*Omega3*T $

matrix; z0 = [y_LC   / y_Pa_p / y_PF_p ] $
matrix; z1 = [y_LC_p / y_Pa_p / y_PF_p ] $
calc; p21_p = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pLo / y_PF_pLo ] $
matrix; z1 = [y_LC_pLo / y_Pa_pLo / y_PF_pLo ] $
calc; p21_pLo = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pHi / y_PF_pHi ] $
matrix; z1 = [y_LC_pHi / y_Pa_pHi / y_PF_pHi ] $
calc; p21_pHi = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_f / y_PF_f ] $
matrix; z1 = [y_LC_f / y_Pa_f / y_PF_f ] $
calc; p21_f = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fLo / y_PF_fLo ] $
matrix; z1 = [y_LC_fLo / y_Pa_fLo / y_PF_fLo ] $
calc; p21_fLo = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fHi / y_PF_fHi ] $
matrix; z1 = [y_LC_fHi / y_Pa_fHi / y_PF_fHi ] $
calc; p21_fHi = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

/* Collect results in subdiagonal matrices and clean up.*/
matrix; P_p = Iden(4) $
matrix; P_pLo = Iden(4) $
matrix; P_pHi = Iden(4) $
matrix; P_f = Iden(4) $
matrix; P_fLo = Iden(4) $
matrix; P_fHi = Iden(4) $

matrix; P_p(1,1) = p11_p $
matrix; P_p(2,1) = p21_p $
matrix; P_p(3,1) = p31_p $
calc; delete p11_p, p21_p, p31_p $

matrix; P_pLo(1,1) = p11_pLo $
matrix; P_pLo(2,1) = p21_pLo $
matrix; P_pLo(3,1) = p31_pLo $
calc; delete p11_pLo, p21_pLo, p31_pLo $

matrix; P_pHi(1,1) = p11_pHi $
matrix; P_pHi(2,1) = p21_pHi $
matrix; P_pHi(3,1) = p31_pHi $
calc; delete p11_pHi, p21_pHi, p31_pHi $

matrix; P_f(1,1) = p11_f $
matrix; P_f(2,1) = p21_f $
matrix; P_f(3,1) = p31_f $
calc; delete p11_f, p21_f, p31_f $

matrix; P_fLo(1,1) = p11_fLo $
matrix; P_fLo(2,1) = p21_fLo $
matrix; P_fLo(3,1) = p31_fLo $
calc; delete p11_fLo, p21_fLo, p31_fLo $

matrix; P_fHi(1,1) = p11_fHi $
matrix; P_fHi(2,1) = p21_fHi $
matrix; P_fHi(3,1) = p31_fHi $
calc; delete p11_fHi, p21_fHi, p31_fHi $


/* Probability of not getting LC but instead getting
   Pleural disease only (p41) */
/* Construct new 3x3 submatrix of Omega4 that gives only
   correlations of LC, Par, and Pl */

matrix; Omega3 = [1 /
                  rhoLCPar, 1/
                  rhoLCPle, rhoParPl, 1] $

/* As before, use Greene's sign convention matrix (page 229)*/
matrix; T = [1,0,0/0,-1,0/0,0,1] $
matrix; Omega3A = T*Omega3*T $
```

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```
matrix; z0 = [y_LC   / y_Pa_p / y_Pl_p] $
matrix; z1 = [y_LC_p / y_Pa_p / y_Pl_p] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pLo / y_Pl_pLo] $
matrix; z1 = [y_LC_pLo / y_Pa_pLo / y_Pl_pLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pHi / y_Pl_pHi] $
matrix; z1 = [y_LC_pHi / y_Pa_pHi / y_Pl_pHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_f / y_Pl_f] $
matrix; z1 = [y_LC_f / y_Pa_f / y_Pl_f] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fLo / y_Pl_fLo] $
matrix; z1 = [y_LC_fLo / y_Pa_fLo / y_Pl_fLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fHi / y_Pl_fHi] $
matrix; z1 = [y_LC_fHi / y_Pa_fHi / y_Pl_fHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

 * Collect results and clean up. */
matrix; P_p(4,1) = p41_p $
matrix; P_pLo(4,1) = p41_pLo $
matrix; P_pHi(4,1) = p41_pHi $
matrix; P_f(4,1) = p41_f $
matrix; P_fLo(4,1) = p41_fLo $
matrix; P_fHi(4,1) = p41_fHi $
calc; delete p41_p, p41_pLo, p41_pHi $
calc; delete p41_f, p41_fLo, p41_fHi $

/* Probability of Not Getting DBID but getting Non-Disabling
   BID in CF (no LC, Par but No PTF) */
/* Use original omega3 submatrix */
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $
/* Sign matrix on order restrictions */
matrix; T = [-1,0,0/0,1,0/0,0,1] $
matrix; Omega3A = T*Omega3*T $
matrix; z = [y_LC  / y_Par / y_PFT ] $
matrix; zA = T*z $
/* Probability of DBID and not LC in BL */
calc; p_DBID = Mvn(zA, Omega3A) $

/* Probability of still getting DBID in CF */
/* Probability of getting only NBID but not DBID in CF */

matrix; z1 = [y_LC / y_Pa_p / y_PF_p ] $
matrix; z1A = T*z1 $
calc; p22_p = Mvn(z1A,Omega3A)/p_DBID $
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```
matrix; z0 = [y_LC / y_Pa_p / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_pLo / y_PF_pLo ] $
matrix; z1A = T*z1 $
calc; p22_pLo = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_pLo / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_pHi / y_PF_pHi ] $
matrix; z1A = T*z1 $
calc; p22_pHi = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_pHi / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_f / y_PF_f ] $
matrix; z1A = T*z1 $
calc; p22_f = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_f / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_fLo / y_PF_fLo ] $
matrix; z1A = T*z1 $
calc; p22_fLo = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_fLo / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_fHi / y_PF_fHi ] $
matrix; z1A = T*z1 $
calc; p22_fHi = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_fHi / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

/* Collect results and clean up. */
matrix; P_p(2,2) = p22_p $
matrix; P_pLo(2,2) = p22_pLo $
matrix; P_pHi(2,2) = p22_pHi $
matrix; P_f(2,2) = p22_f $
matrix; P_fLo(2,2) = p22_fLo $
matrix; P_fHi(2,2) = p22_fHi $
calc; delete p22_p, p22_pLo, p22_pHi $
calc; delete p22_f, p22_fLo, p22_fHi $

matrix; P_p(3,2) = p32_p $
matrix; P_pLo(3,2) = p32_pLo $
matrix; P_pHi(3,2) = p32_pHi $
matrix; P_f(3,2) = p32_f $
matrix; P_fLo(3,2) = p32_fLo $
matrix; P_fHi(3,2) = p32_fHi $
calc; delete p32_p, p32_pLo, p32_pHi $
calc; delete p32_f, p32_fLo, p32_fHi $

/* Probability of getting only pleural in CF given
DBID in BL */

/* Use Omega4 matrix */
matrix; T = [-1,0,0,0/ 0,1,0,0/ 0,0,1,0/ 0,0,0,1] $
matrix; Omega4A = T*Omega4*T $
```

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```
matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_p] $
matrix; z1 = [y_LC/ y_Pa_p/ y_PFT/ y_Pl_p] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_p = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_pLo] $
matrix; z1 = [y_LC/ y_Pa_pLo/ y_PFT/ y_Pl_pLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_pLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_pHi] $
matrix; z1 = [y_LC/ y_Pa_pHi/ y_PFT/ y_Pl_pHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_pHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_f] $
matrix; z1 = [y_LC/ y_Pa_f/ y_PFT/ y_Pl_f] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_f = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_fLo] $
matrix; z1 = [y_LC/ y_Pa_fLo/ y_PFT/ y_Pl_fLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_fLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_fHi] $
matrix; z1 = [y_LC/ y_Pa_fHi/ y_PFT/ y_Pl_fHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_fHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

/* Collect results and clean up. */
matrix; P_p(4,2) = p42_p $
matrix; P_pLo(4,2) = p42_pLo $
matrix; P_pHi(4,2) = p42_pHi $
matrix; P_f(4,2) = p42_f $
matrix; P_fLo(4,2) = p42_fLo $
matrix; P_fHi(4,2) = p42_fHi $
calc; delete p42_p, p42_pLo, p42_pHi $
calc; delete p42_f, p42_fLo, p42_fHi $

/* Probability of NBID in BL */
matrix; T = [-1,0,0/ 0,1,0/ 0,0,-1] $
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $
matrix; Omega3A = T*Omega3*T $


matrix; z = [y_LC / y_Par / y_PFT] $
matrix; zA = T*z $
calc; p_NBID = Mvn(zA,Omega3A) $

/* Probability of NBID in BL and NBID in CF */

matrix; z0 = [y_LC / y_Pa_p / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_p = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_pLo / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_pLo = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_pHi / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_pHi = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_f / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_f = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_fLo / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_fLo = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_fHi / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_fHi = Mvn(z0A,Omega3A)/p_NBID $

/* Collect results and clean up. */
matrix; P_p(3,3) = p33_p $
matrix; P_pLo(3,3) = p33_pLo $
matrix; P_pHi(3,3) = p33_pHi $
matrix; P_f(3,3) = p33_f $
matrix; P_fLo(3,3) = p33_fLo $
matrix; P_fHi(3,3) = p33_fHi $
calc; delete p33_p, p33_pLo, p33_pHi $
calc; delete p33_f, p33_fLo, p33_fHi $

/* Probability of Pl but not NBID in CF given NBID in BL */
/* Use Omega4 matrix */
matrix; T = [-1,0,0,0/ 0,1,0,0/ 0,0,-1,0/ 0,0,0,1] $
matrix; Omega4A = T*Omega4*T $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_p ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_p / y_PFT / y_Pl_p ] $
matrix; z1A = T*z1 $
calc; p43_p = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_pLo ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_pLo / y_PFT / y_Pl_pLo ] $
matrix; z1A = T*z1 $
calc; p43_pLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_pHi ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_pHi / y_PFT / y_Pl_pHi ] $
matrix; z1A = T*z1 $
calc; p43_pHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_f ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_f / y_PFT / y_Pl_f ] $
matrix; z1A = T*z1 $
calc; p43_f = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_fLo ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_fLo / y_PFT / y_Pl_fLo ] $
matrix; z1A = T*z1 $
calc; p43_fLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_fHi ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_fHi / y_PFT / y_Pl_fHi ] $
```


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Ms8a_R2_r2.lim

```
matrix; z1A = T*z1 $
calc; p43_fHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

/* Collect results and clean up. */
matrix; P_p(4,3) = p43_p $
matrix; P_pLo(4,3) = p43_pLo $
matrix; P_pHi(4,3) = p43_pHi $
matrix; P_f(4,3) = p43_f $
matrix; P_fLo(4,3) = p43_fLo $
matrix; P_fHi(4,3) = p43_fHi $
calc; delete p43_p, p43_pLo, p43_pHi $
calc; delete p43_f, p43_fLo, p43_fHi $

/* Probability of pleural injury in BL */
/* Recreate 3x3 submatrix of Omega4 that gives only
   correlations of LC, Par, and Pl */
matrix; Omega3 = [1 /
                  rhoLCPar, 1/
                  rhoLCPle, rhoParPl, 1] $
matrix; T = [-1,0,0/ 0,-1,0/ 0,0,1] $
matrix; Omega3A = T*Omega3*T $
matrix; z0 = [y_LC / y_Par / y_Ple ] $
matrix; z0A = T*z0 $
calc; p_Pl = Mvn(z0A, Omega3A) $

/* Probability of Pl in CF given Pl in BL */
matrix; z1 = [y_LC / y_Par / y_Pl_p] $
matrix; z1A = T*z1 $
calc; p44_p = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_pLo] $
matrix; z1A = T*z1 $
calc; p44_pLo = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_pHi] $
matrix; z1A = T*z1 $
calc; p44_pHi = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_f] $
matrix; z1A = T*z1 $
calc; p44_f = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_fLo] $
matrix; z1A = T*z1 $
calc; p44_fLo = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_fHi] $
matrix; z1A = T*z1 $
calc; p44_fHi = Mvn(z1A,Omega3A)/p_Pl $

/* Collect results and clean up. */
matrix; P_p(4,4) = p44_p $
matrix; P_pLo(4,4) = p44_pLo $
matrix; P_pHi(4,4) = p44_pHi $
matrix; P_f(4,4) = p44_f $
matrix; P_fLo(4,4) = p44_fLo $
matrix; P_fHi(4,4) = p44_fHi $
```

tab 73, p. 1

Dm5_ms8a_R2_r2.do


```
* @RM500
* DM5:  Computation of present discounted value (PDV)
* of 'past' non-FDD resolved and unresolved claims.
* Input files:  lv6; "Risk Free Interest Rate"; ms7a
* This version is used ms7a as input file. No effect of removing of Plural
* Program modifies DM3
clear
prog drop _all
set rmsg off
set more off
set matsize 500


log using dm5_ms8a, replace

* (0) Liquidated value of unresolved claims (based on TDP)
* from [MatrixREV95.xls]Unresolved:
matrix U = (88400, 25400, 51500, 12500)
matrix colnames U = LC NBID DBID Pl
matrix rownames U = LiqVal

* Administrative costs per claim from [MatrixREV95.xls]admin_costs
matrix C = (577 \ 210 )
matrix rownames C = past unres
matrix colnames C = ad_cost
matrix li C


* (1) Compute discount factors
use Risk Free Interest Rate
* Drop 1988-1991 (Courts' Preliminary Orders cover only 1992+)
drop in 1/4
qui gen n = 2000 - _n
sort n
gen dFactor = 1 in 1
qui replace dF = dF[_n-1]*(1 + I/100) in 2/9
form dF %9.3f
sort y
drop n I
l

* (2) Merge with lv6; incl. admin costs and unresolved claims
merge year using lv6
drop _m

* Estimated Liquidated Values of Unresolved Claims
qui replace VR_LC = U[1,1] if y == 2000
qui replace VS_LC = U[1,1] if y == 2000
qui replace VR_NBID = U[1,2] if y == 2000
qui replace VS_NBID = U[1,2] if y == 2000
qui replace VR_DBID = U[1,3] if y == 2000
qui replace VS_DBID = U[1,3] if y == 2000
qui replace VR_Pl = U[1,4] if y == 2000
qui replace VS_Pl = U[1,4] if y == 2000

* Add admin costs of past resolved claims to LiqVals
qui replace VR_LC = VR_LC + C[1,1] if y < 2000
qui replace VR_NBID = VR_NBID + C[1,1] if y < 2000
qui replace VR_DBID = VR_DBID + C[1,1] if y < 2000
qui replace VR_Pl = VR_Pl + C[1,1] if y < 2000
qui replace VS_LC = VS_LC + C[1,1] if y < 2000
qui replace VS_NBID = VS_NBID + C[1,1] if y < 2000
qui replace VS_DBID = VS_DBID + C[1,1] if y < 2000
qui replace VS_Pl = VS_Pl + C[1,1] if y < 2000

* Add admin costs to unresolved claims to LiqVals
qui replace VR_LC = VR_LC + C[2,1] if y == 2000
qui replace VR_NBID = VR_NBID + C[2,1] if y == 2000
qui replace VR_DBID = VR_DBID + C[2,1] if y == 2000
qui replace VR_Pl = VR_Pl + C[2,1] if y == 2000
qui replace VS_LC = VS_LC + C[2,1] if y == 2000
qui replace VS_NBID = VS_NBID + C[2,1] if y == 2000
qui replace VS_DBID = VS_DBID + C[2,1] if y == 2000
qui replace VS_Pl = VS_Pl + C[2,1] if y == 2000

* (3) Compute PDV of Liq Val + Admin Costs by Dx and Year
qui replace VR_LC = VR_LC * dF
qui replace VR_NBID = VR_NBID * dF
qui replace VR_DBID = VR_DBID * dF
qui replace VR_Pl = VR_Pl * dF
qui replace VS_LC = VS_LC * dF
qui replace VS_NBID = VS_NBID * dF
qui replace VS_DBID = VS_DBID * dF
qui replace VS_Pl = VS_Pl * dF
drop dF

* (4) Convert to matrices (Note: Order needs to be conformal with
*     order of rows in subdiagonal P-matrices in ms7a and ms7)
* RICO
  qui replace YR_LC = 0 if YR_LC == .
  qui replace YR_NBID = 0 if YR_NBID == .
  qui replace YR_DBID = 0 if YR_DBID == .
  qui replace YR_Pl = 0 if YR_Pl == .
  mkmat YR_LC
  mkmat YR_NBID
  mkmat YR_DBID
  mkmat YR_Pl
  matrix YR = YR_LC, YR_DBID, YR_NBID, YR_Pl
  matrix drop YR_LC YR_NBID YR_DBID YR_Pl
  matrix colnames YR = LC DBID NBID Pl
  matrix rownames YR = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li YR, format(%8.0f) title("RICO Claims by Dx Year")

  qui replace VR_LC = 0 if VR_LC == .
  qui replace VR_NBID = 0 if VR_NBID == .
  qui replace VR_DBID = 0 if VR_DBID == .
  qui replace VR_Pl = 0 if VR_Pl == .
  mkmat VR_LC
  mkmat VR_NBID
  mkmat VR_DBID
  mkmat VR_Pl
  matrix VR = VR_LC, VR_DBID, VR_NBID, VR_Pl
  matrix drop VR_LC VR_NBID VR_DBID VR_Pl
  matrix colnames VR = LC DBID NBID Pl
  matrix rownames VR = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li VR, format(%8.0f) title("RICO PDV LiqVal+AdmCost by Dx Year")

* SFA
  qui replace YS_LC = 0 if YS_LC == .
  qui replace YS_NBID = 0 if YS_NBID == .
  qui replace YS_DBID = 0 if YS_DBID == .
  qui replace YS_Pl = 0 if YS_Pl == .
  mkmat YS_LC
  mkmat YS_NBID
  mkmat YS_DBID
  mkmat YS_Pl
  matrix YS = YS_LC, YS_DBID, YS_NBID, YS_Pl
  matrix drop YS_LC YS_NBID YS_DBID YS_Pl
  matrix colnames YS = LC DBID NBID Pl
```

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Dm5_ms8a_R2_r2.do

```
  matrix rownames YS = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li YS, format(%8.0f) title("SFA Claims by Dx Year")

  qui replace VS_LC = 0 if VS_LC == .
  qui replace VS_NBID = 0 if VS_NBID == .
  qui replace VS_DBID = 0 if VS_DBID == .
  qui replace VS_P1 = 0 if VS_P1 == .
  mkmat VS_LC
  mkmat VS_DBID
  mkmat VS_NBID
  mkmat VS_P1
  matrix VS = VS_LC, VS_DBID, VS_NBID, VS_P1
  matrix drop VS_LC VS_NBID VS_DBID VS_P1
  matrix colnames VS = LC DBID NBID P1
  matrix rownames VS = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li VS, format(%8.0f) title("SFA PDV LiqVal+AdmCost by Dx Year")

* (4) Get P-matrix from ms7a
* Note: This file has a slightly format than cr1 (as used in dm4)
drop _all
use ms8a_R2_r2
* Use only 'past' estimates of P-matrix
keep if Era == 0
l,nod
* Loop through (low,med,high) (n = 1,2,3)
qui gen double PDV_RICO = .
qui gen double PDV_SFA = .
form PDV* %9.1f
matrix P = J(4,4,0)
prog def getPDV
  global n = 1
  while $n <= 3 {
    matrix P[1,1] = p11[$n]
    matrix P[2,1] = p21[$n]
    matrix P[2,2] = p22[$n]
    matrix P[3,1] = p31[$n]
    matrix P[3,2] = p32[$n]
    matrix P[3,3] = p33[$n]
    matrix P[4,1] = p41[$n]
    matrix P[4,2] = p42[$n]
    matrix P[4,3] = p43[$n]
    matrix P[4,4] = p44[$n]
di "case: ", $n
matrix li P
* Compute PDV for both RICO & SFA
    matrix DR = trace(VR * (I(4) - P) * YR')
    qui replace PDV_RICO = DR[1,1]/1e6 in $n
    matrix DS = trace(VS * (I(4) - P) * YS')
    qui replace PDV_SFA = DS[1,1]/1e6 in $n

* Save results in median case (n=2) for graphs and tables
    if $n == 2 {
* FR and FS are annual financial injury from RICO and SFA
      matrix FR = vecdiag(VR * (I(4) - P) * YR')
      matrix FS = vecdiag(VS * (I(4) - P) * YS')
      matrix FR = FR'
      matrix FS = FS'
* ZR and ZS are annual claims by Dx in counterfactual scenario (median case)
      matrix ZR = P * YR'
      matrix ZS = P * YS'
      matrix ZR = ZR'
      matrix ZS = ZS'
    }

    global n = $n + 1
  }
end
getPDV
l Era Range PDV_R PDV_S,nod

* Display results for median case for graphs and tables
drop _all
* Financial injury by year
svmat FR
svmat FS
qui replace FR = FR/1e6
qui replace FS = FS/1e6
gen int year = _n + 1991
svmat ZR
ren ZR1 ZR_LC
ren ZR2 ZR_DBID
ren ZR3 ZR_NBID
ren ZR4 ZR_P1
svmat ZS
ren ZS1 ZS_LC
ren ZS2 ZS_DBID
ren ZS3 ZS_NBID
ren ZS4 ZS_P1
order y FR FS ZR* ZS*
form F* Z* %8.0f
l y F*,ncd
l y Z*,nod

save Claims_P,replace

log close
\032
```


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dm5_ms8a.log


```
. * (0) Liquidated value of unresolved claims (based on TDP)
. * from [MatrixREV95.xls]Unresolved:
. matrix U = (88400, 25400, 51500, 12500)

. matrix colnames U = LC NBID DBID Pl

. matrix rownames U = LiqVal

.
. * Administrative costs per claim from [MatrixREV95.xls]admin_costs
. matrix C = (577 \ 210 )

. matrix rownames C = past unres

. matrix colnames C = ad_cost

. matrix li C

C[2,1]
       ad_cost
 past      577
unres      210

.
.
. * (1) Compute discount factors
. use Risk Free Interest Rate

. * Drop 1988-1991 (Courts' Preliminary Orders cover only 1992+)
. drop in 1/4
(4 observations deleted)

. qui gen n = 2000 - _n

. sort n

. gen dFactor = 1 in 1
(8 missing values generated)

. qui replace dF = dF[_n-1]*(1 + I/100) in 2/9

. form dF %9.3f

. sort y

. drop n I

. l

        year    dFactor
  1.    1992      1.418
  2.    1993      1.370
  3.    1994      1.331
  4.    1995      1.281
  5.    1996      1.213
  6.    1997      1.153
  7.    1998      1.096
  8.    1999      1.045
  9.    2000      1.000

.
. * (2) Merge with lv6: incl. admin costs and unresolved claims
. merge year using lv6

. drop _m

.
. * Estimated Liquidated Values of Unresolved Claims
. qui replace VR_LC = U[1,1] if y == 2000

. qui replace VS_LC = U[1,1] if y == 2000

. qui replace VR_NBID = U[1,2] if y == 2000

. qui replace VS_NBID = U[1,2] if y == 2000

. qui replace VR_DBID = U[1,3] if y == 2000

. qui replace VS_DBID = U[1,3] if y == 2000

. qui replace VR_Pl = U[1,4] if y == 2000

. qui replace VS_Pl = U[1,4] if y == 2000

.
. * Add admin costs of past resolved claims to LiqVals
. qui replace VR_LC = VR_LC + C[1,1] if y < 2000

. qui replace VR_NBID = VR_NBID + C[1,1] if y < 2000

. qui replace VR_DBID = VR_DBID + C[1,1] if y < 2000

. qui replace VR_Pl = VR_Pl + C[1,1] if y < 2000

. qui replace VS_LC = VS_LC + C[1,1] if y < 2000

. qui replace VS_NBID = VS_NBID + C[1,1] if y < 2000

. qui replace VS_DBID = VS_DBID + C[1,1] if y < 2000

. qui replace VS_Pl = VS_Pl + C[1,1] if y < 2000

.
. * Add admin costs to unresolved claims to LiqVals
. qui replace VR_LC = VR_LC + C[2,1] if y == 2000

. qui replace VR_NBID = VR_NBID + C[2,1] if y == 2000

. qui replace VR_DBID = VR_DBID + C[2,1] if y == 2000

. qui replace VR_Pl = VR_Pl + C[2,1] if y == 2000

. qui replace VS_LC = VS_LC + C[2,1] if y == 2000

. qui replace VS_NBID = VS_NBID + C[2,1] if y == 2000

. qui replace VS_DBID = VS_DBID + C[2,1] if y == 2000

. qui replace VS_Pl = VS_Pl + C[2,1] if y == 2000

.
. * (3) Compute PDV of Liq Val + Admin Costs by Dx and Year
. qui replace VR_LC = VR_LC * dF

. qui replace VR_NBID = VR_NBID * dF

. qui replace VR_DBID = VR_DBID * dF
```

dm5_ms8a.log

```
. qui replace VR_Pl = VR_Pl * dF

. qui replace VS_LC = VS_LC * dF

. qui replace VS_NBID = VS_NBID * dF

. qui replace VS_DBID = VS_DBID * dF

. qui replace VS_Pl = VS_Pl * dF

. drop dF

.
.
. * (4) Convert to matrices (Note: Order needs to be conformal with
. *     order of rows in subdiagonal P-matrices in ms7a and ms7)
. * RICO
.   qui replace YR_LC = 0 if YR_LC == .

.   qui replace YR_NBID = 0 if YR_NBID == .

.   qui replace YR_DBID = 0 if YR_DBID == .

.   qui replace YR_Pl = 0 if YR_Pl == .

.   mkmat YR_LC

.   mkmat YR_NBID

.   mkmat YR_DBID

.   mkmat YR_Pl

.   matrix YR = YR_LC, YR_DBID, YR_NBID, YR_Pl

.   matrix drop YR_LC YR_NBID YR_DBID YR_Pl

.   matrix colnames YR = LC DBID NBID Pl

.   matrix rownames YR = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li YR, format(%8.0f) title("RICO Claims by Dx Year")

YR[9,4]:  RICO Claims by Dx Year
           LC    DBID    NBID      Pl
1992        0       0       0       0
1993        0       0       0       0
1994        0       0       0       0
1995        0       0       0       0
1996      469      18      50      41
1997      852     501    1155    1024
1998     1408    2386    3823    3811
1999     2265   16423   24116    8291
2000     2960   15359   24575   10674

.
.   qui replace VR_LC = 0 if VR_LC == .

.   qui replace VR_NBID = 0 if VR_NBID == .

.   qui replace VR_DBID = 0 if VR_DBID == .

.   qui replace VR_Pl = 0 if VR_Pl == .

.   mkmat VR_LC

.   mkmat VR_NBID

.   mkmat VR_DBID

.   mkmat VR_Pl

.   matrix VR = VR_LC, VR_DBID, VR_NBID, VR_Pl

.   matrix drop VR_LC VR_NBID VR_DBID VR_Pl

.   matrix colnames VR = LC DBID NBID Pl

.   matrix rownames VR = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li VR, format(%8.0f) title("RICO PDV LiqVal+AdmCost by Dx Year")

VR[9,4]:  RICO PDV LiqVal+AdmCost by Dx Year
           LC    DBID    NBID      Pl
1992        0       0       0       0
1993        0       0       0       0
1994        0       0       0       0
1995        0       0       0       0
1996   106213   61370   31035   15261
1997   101419   58751   29730   14549
1998    96865   55924   28138   13853
1999    92414   52990   26774   12980
2000    88610   51710   25610   12710

.
. * SFA
.   qui replace YS_LC = 0 if YS_LC == .

.   qui replace YS_NBID = 0 if YS_NBID == .

.   qui replace YS_DBID = 0 if YS_DBID == .

.   qui replace YS_Pl = 0 if YS_Pl == .

.   mkmat YS_LC

.   mkmat YS_NBID

.   mkmat YS_DBID

.   mkmat YS_Pl

.   matrix YS = YS_LC, YS_DBID, YS_NBID, YS_Pl

.   matrix drop YS_LC YS_NBID YS_DBID YS_Pl

.   matrix colnames YS = LC DBID NBID Pl

.   matrix rownames YS = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li YS, format(%8.0f) title("SFA Claims by Dx Year")

YS[9,4]:  SFA Claims by Dx Year
           LC    DBID    NBID      Pl
1992       14       1       0       0
1993       17       2       0       0
1994      555       6       3       0
1995      933      44      30      21
1996     1612    1003    3356    3722
1997     2405    4262    7262    5453
```

dm5_ms8a.log

```
1998    2111    3967    6992    5907
1999    2653   22284   35603   12023
2000    3685   20135   30318   13653

.
.   qui replace VS_LC = 0 if VS_LC == .

.   qui replace VS_NBID = 0 if VS_NBID == .

.   qui replace VS_DBID = 0 if VS_DBID == .

.   qui replace VS_Pl = 0 if VS_Pl == .

.   mkmat VS_LC

.   mkmat VS_DBID

.   mkmat VS_NBID

.   mkmat VS_Pl

.   matrix VS = VS_LC, VS_DBID, VS_NBID, VS_Pl

.   matrix drop VS_LC VS_NBID VS_DBID VS_Pl

.   matrix colnames VS = LC DBID NBID Pl

.   matrix rownames VS = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li VS, format(%8.0f) title("SFA PDV LiqVal+AdmCost by Dx Year")

VS[9,4]:  SFA PDV LiqVal+AdmCost by Dx Year
          LC      DBID     NBID       Pl
1992  159788     71719      818      818
1993  131377     69287      790      790
1994  115516     72882    34051      768
1995  113591     69612    33136    16613
1996  106310     62012    31374    15464
1997  101889     59378    30011    14811
1998   97037     56279    28231    13909
1999   92715     52772    26779    12661
2000   88610     51710    25610    12710

.
. * (4) Get P-matrix from ms7a
. * Note: This file has a slightly format than cr1 (as used in dm3)
. drop _all

. use ms8a_R2_r2

. * Use only 'past' estimates of P-matrix
. keep if Era == 0
(3 observations deleted)

. l,nod

          Era      Range        p11        p21        p22        p31        p32
>         p33        p41        p42        p43        p44
  1.     Past         Lo     0.9467     0.0177     0.9803     0.0229     0.0102
>      0.9886     0.0090     0.0080     0.0074     1.0000
  2.     Past        Med     0.9467     0.0177     0.9803     0.0229     0.0102
>      0.9886     0.0090     0.0080     0.0074     1.0000
  3.     Past         Hi     0.9467     0.0177     0.9803     0.0229     0.0102
>      0.9886     0.0090     0.0080     0.0074     1.0000
```

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```
. * Loop through (low,med,high) (n = 1,2,3)
. qui gen double PDV_RICO = .

. qui gen double PDV_SFA = .

. format PDV* %9.1f

. matrix P = J(4,4,0)

. prog def getPDV
      global n = 1
      while $n <= 3 {
        matrix P[1,1] = p11[$n]
        matrix P[2,1] = p21[$n]
        matrix P[2,2] = p22[$n]
        matrix P[3,1] = p31[$n]
        matrix P[3,2] = p32[$n]
        matrix P[3,3] = p33[$n]
        matrix P[4,1] = p41[$n]
        matrix P[4,2] = p42[$n]
        matrix P[4,3] = p43[$n]
        matrix P[4,4] = p44[$n]
  di "case: ", $n
  matrix li P
  * Compute PDV for both RICO & SFA
.     matrix DR = trace(VR * (I(4) - P) * YR')
        qui replace PDV_RICO = DR[1,1]/1e6 in $n
        matrix DS = trace(VS * (I(4) - P) * YS')
        qui replace PDV_SFA = DS[1,1]/1e6 in $n

. * Save results in median case (n=2) for graphs and tables
.     if $n == 2 {
  * FR and FS are annual financial injury from RICO and SFA
.       matrix FR = vecdiag(VR * (I(4) - P) * YR')
          matrix FS = vecdiag(VS * (I(4) - P) * YS')
          matrix FR = FR'
          matrix FS = FS'
  * ZR and ZS are annual claims by Dx in counterfactual scenario (median cas
> e)
.       matrix ZR = P * YR'
          matrix ZS = P * YS'
          matrix ZR = ZR'
          matrix ZS = ZS'
      }

.     global n = $n + 1
   }
 end

. getPDV
case:  1

P[4,4]
            c1          c2          c3          c4
r1   .94669998           0           0           0
r2       .0177   .98030001           0           0
r3       .0229       .0102   .98860002           0
r4        .009        .008       .0074           1
case:  2

P[4,4]
            c1          c2          c3          c4
r1   .94669998           0           0           0
r2       .0177   .98030001           0           0
r3       .0229       .0102   .98860002           0
```

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dm5_ms8a.log

```
r4        .009        .008       .0074          1
case:  3

F[4,4]
              c1          c2          c3
r1    .94569998           0           0          0
r2        .0177   .98030001           0          0
r3        .0229       .0102   .98860002          0
r4         .009        .008       .0074          1

. l Era Range PDV_R PDV_S,nod

           Era       Range    PDV_RICO    PDV_SFA
  1.      Past          Lo        60.3      100.4
  2.      Past         Med        60.3      100.4
  3.      Past          Hi        60.3      100.4


. * Display results for median case for graphs and tables
. drop _all

. * Financial injury by year
. svmat FR
number of observations will be reset to 9
Press any key to continue, or Break to abort
obs was 0, now 9

. svmat FS

. qui replace FR = FR/1e6

. qui replace FS = FS/1e6

. gen int year = _n + 1991

. svmat ZR

. ren ZR1 ZR_LC

. ren ZR2 ZR_DBID

. ren ZR3 ZR_NBID

. ren ZR4 ZR_P1

. svmat ZS

. ren ZS1 ZS_LC

. ren ZS2 ZS_DBID

. ren ZS3 ZS_NBID

. ren ZS4 ZS_P1

. order y FR FS ZR* ZS*

. form F* Z* %8.0f

. l y F*,nod

        year       FR1       FS1
  1.    1992         0         0
  2.    1993         0         0
  3.    1994         0         2
  4.    1995         0         4
  5.    1996 [illegible] [illegible]
  6.    1997 [illegible] 1[illegible]
  7.    1998 [illegible] 1[illegible]
  8.    1999 [illegible] 3[illegible]
  9.    2000        24        31

. l y Z*,nod

        year     ZR_LC   ZR_DBID   ZR_NBID     ZR_P1     ZS_LC   ZS_DBID   ZS_
> NBID     ZS_P1
  1.    1992         0         0         0         0        13         1
> [illegible]         0
  2.    1993         0         0         0         0        16         2
>    0         0
  3.    [illegible] [illegible] [illegible] 0         0       525        16
> [illegible] [illegible]
  4.    1995 [illegible] [illegible]       0         0       883        60
> [illegible] [illegible]
  5.    1996       435        26        60        46      1526      1012
> 3365      3769
  6.    1997       807       604      1177      1045      2277      4221
> 7278      5562
  7.    1998      1333      2364      3836      3871      1998      3926
> 7001      6009
  8.    1999      2144     16140     24060      8621      2512     21892     3
> 5485     12489
  9.    2000      2802     15109     24519     11005      3489     19804     3
> 0262     14072

. save Claims_P,replace
(Note: file Claims_P.dta not found)
file Claims_P.dta saved

.
. log close
```

go to:
tab 73, p. 4 (formatted)
WEW 3, p. 4 fn 14

Wecker changes
– remove asbestos specific quit and initiation rate effects (see p. 15, 26 this tab)
past IR, past QR

41

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Compute Tab 3, p5

nir5_r2.do

```
* @RM500
* nir5: BL-CF differences in proportion of ever-smokers and
* mean smoke-years exposure of claimants in HRA audit files
* Relative risk initiation model hC(t) = r1*hB(t) if year >= T1
* hC(t) = r2*hB(t) if year >= T2, where T2 > T1
* hC(t) = r3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* Age distribution for future claimants from age9.dta
* Baseline cumulative smoking initiation curve from nir3.dta
* crossover insulators excluded
*
* Scenario     pre-88 misconduct     Estimate     r1     r2     r3
*    BL              -                  -         1.0    1.0    1.0
*    CF             yes                low        1.0    0.8    1.0
*    CF             yes                mid        0.9    0.7    1.0
*    CF             yes                high       0.8    0.6    1.0
*
clear
prog drop _all
set rmsg off
set more off
set matsize 200

log using nir5, replace

* (1) get distribution of birth year of all claimants from age9.dta
use age9
keep year AllFutur
mkmat year AllFutur
matrix pi = year,AllFutur
matrix drop year AllFutur
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix list pi

* No correction here for year first exposed to asbestos
* (Comparison of output of nir2 and nir3 shows little effect)

* (2) Get baseline cumulative initiation curve from nir3.dta
drop _all
use nir3_r2
gen SB = 1 - FB
lab var x "Age"

* (3) Computation of initation rates in CF scenario
* Cutoff years for decrease in initiation rates are $T1, max($T2,Ylexp), max($T3,Ylexp)
* Relative decrease in initiation rate (on or after year T1) is global variable $r1
* Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global variable $
r2
* Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global variable $
r3

* SB(x) cumulative proportion not smoking through age x in BL scenario.
keep x SB
sort x
order x SB
* Set xMax
* Age 50 set as cutoff for ever smoking
global xMax = 50
drop if x > $xMax
qui sum x
global xMin = r(min)

global N = _N

* Lifetime probability of not smoking by age $xMax in BL scenario
  global PB = SB[$N]
* Conditional survival curve in BL scenario
  qui gen SB_ = 1 - (1 - SB)/(1 - $PB)
  qui sum SB_
* Mean age started among those starting by age $xMax in BL scenario
  global XB = $xMin + r(mean)*$N
  di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
  di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
  drop SB_

* SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
qui gen SBr1 = .
qui gen SBr2 = .
qui gen SBr3 = .
qui gen SC = .

prog def getSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global r1 = $_4
  global r2 = $_5
  global r3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }

* Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
  qui replace SBr1 = SB^$r1
  qui replace SBr2 = SB^$r2
  qui replace SBr3 = SB^$r3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t))^(r1-r2)*SB(mi
n(x,T3-t))^(r2-r3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
    local p = pi['i',2]
*   'x1' = age at T1
    local x1 = $T1 - 't'
*   'x2' = age at T2
    local x2 = min($T2 - 't',$xMax)
*   'x3' = age at T3
    local x3 = min($T3 - 't',$xMax)
* Note: x3 >= x2 >= x1
*      'v1' = obs# at age at T1
       local u1 = 'x1' - $xMin
       local v1 = 'x1' - $xMin + 1
*      'v2' = obs# at age at T2
       local u2 = 'x2' - $xMin
       local v2 = 'x2' - $xMin + 1
*      'v3' = obs# at age at T3
       local u3 = 'x3' - $xMin
       local v3 = 'x3' - $xMin + 1
* Note: u3 >= u2 >= u1
       local A1 = SB['u1']^(1-$r1)
       local A2 = SB['u2']^($r1-$r2)
```

1

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nir5_r2.do

```
    local A3 = SB['u3']^($r2-$r3)
* DEBUGGING
*     di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1', 'u2', 'u3
',"v1,v2,v3= ", 'v1', 'v2', 'v3'
*   Null Case:
    if 'x1' >= $xMax {
* DEBUGGING
*     di "Null case"
      qui replace SC = SC + 'p' * SB
    }
    else {
      if 'u3' <= 0 {
* Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
* DEBUGGING
*       di "Case A"
          qui replace SC = SC + 'p' * SBr3
      }
      else {
        if 'u3' > 0 & 'u2' <= 0 {
*         di "Case B"
* Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
* DEBUGGING
          qui replace SC = SC + 'p' * SBr2 in 1/'u3'
          if 'v3' <= $N {
            qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
          }
        }
        else {
          if 'u2' > 0 & 'u1' <= 0 {
* Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*     di "Case C"
            qui replace SC = SC + 'p' * SBr1 in 1/'u2'
            if 'v2' <= 'u3' {
              qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
            }
            if 'v3' <= $N {
              qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
            }
          }
          else {
* Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*     di "Case D"
            qui replace SC = SC + 'p' * SB in 1/'u1'
            qui replace SC = SC + 'p' * SBr1 * 'A1' in 'v1'/'u2'
            if 'v2' <= 'u3' {
              qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'v2'/'u3'
            }
            if 'v3' <= $N {
              qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3'/$N
            }
          }
        }
      }
    }
    local i = 'i' + 1
  }
* Lifetime probability of not smoking by age $xMax in CF scenario
  global PC = SC[$N]
* Conditional survival curve in CF scenario
  tempvar SC_
  qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
  qui sum 'SC_'
```

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```
* Mean age started among those starting by age $xMax in CF scenario
  global XC = $xMin + r(mean)*$N
  di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3f $PC - $PB, %7
.1f $XB - $XC
end

prog def rangeSC
  di "    T1      T2      T3      r1      r2      r3   deltaP deltaX"
  getSC 1954 1963 2001 1.0 1.0 1.0
  getSC 1954 1963 2001 1.0 0.9 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  qui gen FC_lo = 1 - SC
  lab var FC_lo "FC (no post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.8 0.8
  qui gen FC7lo = 1 - SC
  lab var FC7lo "FC (post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.7 1.0
  getSC 1954 1963 2001 1.0 0.6 1.0
  getSC 1954 1963 2001 0.9 0.9 1.0
  getSC 1954 1963 2001 0.9 0.8 1.0

******Wecker Change: replace 0.7 with 1.0*****

*getSC 1954 1963 2001 0.9 0.7 1.0
 getSC 1954 1963 2001 0.9 1.0 1.0

**************End Wecker Change************

  qui gen FC_ = 1 - SC
  lab var FC_ "FC (no post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.7 0.7
  qui gen FC7 = 1 - SC
  lab var FC7 "FC (post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.6 1.0
  getSC 1954 1963 2001 0.8 0.8 1.0
  getSC 1954 1963 2001 0.8 0.7 1.0
  getSC 1954 1963 2001 0.8 0.6 1.0
  qui gen FC_hi = 1 - SC
  lab var FC_hi "FC (no post-2000 Misconduct) high est."
  getSC 1954 1963 2001 0.8 0.6 0.6
  qui gen FC7hi = 1 - SC
  lab var FC7hi "FC (post-2000 Misconduct) high est."

end

rangeSC

qui gen FB = 1 - SB
* Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumulative Proport
ion Who Have Begun to Smoke")saving(nir5a,replace)
gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumulative Propor
tion Who Have Begun to Smoke")saving(nir5b,replace)
keep x F*
form x %6.0f
form F* %7.3f
save nir5_r2, replace
* List data
l,nod

* Compute changes in proportion who ever smoked
global N = _N
* Baseline scenario:
di %9.3f FB[$N]
```

2

nir5_r2.do

```
prog def Results
 di "---      Decrease in proportion smoked     ---"
 di "Post-2000         Low         Middle        High"
 di "Misconduct        Est.        Est.          Est."
 di " Yes    ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[$N] - FC7hi[$N]
 |
 di " No     ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[$N] - FC_hi[$N]
 |
end
Results

log close
:032
```


3

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nir5.log

```
. * (1) get distribution of birth year of all claimants from age9.dta
. use age9

. keep year AllFutur

. mkmat year AllFutur

. matrix pi = year,AllFutur

. matrix drop year AllFutur

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix list pi

pi[72,2]
            t      pi(t)
 r1      1900  .00004113
 r2      1901  .00002101
 r3      1902  .00003102
 r4      1903  .00004538
 r5      1904  .00006578
 r6      1905  .00009443
 r7      1906  .00013421
 r8      1907   .0001888
 r9      1908  .00026279
r10      1909  .00036178
r11      1910  .00049251
r12      1911  .00066282
r13      1912  .00088162
r14      1913  .00115874
r15      1914  .00150459
r16      1915  .00192976
r17      1916  .00244442
r18      1917  .00305756
r19      1918  .00377616
r20      1919  .00460425
r21      1920  .00554198
r22      1921  .00658479
r23      1922  .00772278
r24      1923  .00894043
r25      1924  .01021674
r26      1925  .01152602
r27      1926  .01283937
r28      1927  .01412696
r29      1928   .0153611
r30      1929  .01652004
r31      1930   .0175923
r32      1931  .01858097
r33      1932  .01950742
r34      1933  .02041352
r35      1934  .02136119
r36      1935  .02242851
r37      1936  .02370143
r38      1937  .02526133
r39      1938  .02716919
r40      1939   .0294484
r41      1940  .03206937
r42      1941  .03493946
r43      1942  .03790151
r44      1943  .04074331
r45      1944  .04321814
r46      1945  [illegible]
r47      1946  [illegible]
r48      1947  [illegible]
r49      1948  [illegible]
r50      1949  .04289862
r51      1950  .03982827
r52      1951  .03601309
r53      1952  .03170149
r54      1953  .02716146
r55      1954   .0226488
r56      1955  .01838121
r57      1956  .01452142
r58      1957  .01117046
r59      1958  .00837034
r60      1959  [illegible]
r61      1960  [illegible]
r62      1961  [illegible]
r63      1962  [illegible]
r64      1963  .00137566
r65      1964  .00090207
r66      1965  .00058381
r67      1966  .00037486
r68      1967   .0002404
r69      1968  .00015518
r70      1969  .00010166
r71      1970   .0000681
r72      1971  .00017831

.
. * No correction here for year first exposed to asbestos
. * (Comparison of output of nir2 and nir3 shows little effect)
.
. * (2) Get baseline cumulative initiation curve from nir3.dta
. drop _all

. use nir3_r2

. gen SB = 1 - FB

. lab var x "Age"

.
. * (3) Computation of initation rates in CF scenario
. * Cutoff years for decrease in initiation rates are $T1, max($T2,Ylexp), max(
> $T3,Ylexp)
. * Relative decrease in initiation rate (on or after year T1) is global variab
> le $r1
. * Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global
>  variable $r2
. * Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global
>  variable $r3
.
. * SB(x) cumulative proportion not smoking through age x in BL scenario.
. keep x SB

. sort x

. order x SB

. * Set xMax
. * Age 50 set as cutoff for ever smoking
. global xMax = 50
```

4

52614 0833

nir5.log


```
. drop if x > $xMax
(0 observations deleted)

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * Lifetime probability of not smoking by age $xMax in BL scenario
.   global PB = SB[$N]

. * Conditional survival curve in BL scenario
.   qui gen SB_ = 1 - (1 - SB)/(1 - $PB)

.   qui sum SB_

. * Mean age started among those starting by age $xMax in BL scenario
.   global XB = $xMin + r(mean)*$N

.   di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
Probability of not smoking (by age 50) =    0.243

.   di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
Mean age started (among those starting by age 50) =     20.7

.   drop SB_

.
.
. * SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
. qui gen SBr1 = .

. qui gen SBr2 = .

. qui gen SBr3 = .

. qui gen SC = .

.
. prog def getSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
.   global T1 = $_1
  2.   global T2 = $_2
  3.   global T3 = $_3
  4.   global r1 = $_4
  5.   global r2 = $_5
  6.   global r3 = $_6
  7. * Check T3 > T2 > T1
.   if $T2 <= $T1 | $T3 <= $T2 {
  8.     di "Invalid ",%9.0f $T1,$T2,$T3
  9.     exit
 10.     }
 11.
. * Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
.   qui replace SBr1 = SB^$r1
 12.   qui replace SBr2 = SB^$r2
 13.   qui replace SBr3 = SB^$r3
 14.   qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t)
> )^(r1-r2)*SB(min(x,T3-t))^(r2-r3) for all x
. * Sum over index 'i' (rows of pi)
.   local i = 1
 16.   while 'i' <= $m {
 17.     local t = pi['i',1]
 18.     local p = pi['i',2]
 19. *   'x1' = age at T1
.   local x1 = $T1 - 't'
 20. *   'x2' = age at T2
.   local x2 = min($T2 - 't',$xMax)
 21. *   'x3' = age at T3
.   local x3 = min($T3 - 't',$xMax)
 22. * Note: x3 >= x2 >= x1
. *   'v1' = obs# at age at T1
.     local u1 = 'x1' - $xMin
 23.       local v1 = 'x1' - $xMin + 1
 24. *     'v2' = obs# at age at T2
.     local u2 = 'x2' - $xMin
 25.       local v2 = 'x2' - $xMin + 1
 26. *     'v3' = obs# at age at T3
.     local u3 = 'x3' - $xMin
 27.       local v3 = 'x3' - $xMin + 1
 28. * Note: u3 >= u2 >= u1
.       local A1 = SB['u1']^(1-$r1)
 29.       local A2 = SB['u2']^($r1-$r2)
 30.       local A3 = SB['u3']^($r2-$r3)
 31. * DEBUGGING
. *     di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1'
> , 'u2', 'u3',"v1,v2,v3= ", 'v1', 'v2', 'v3'
. *   Null Case:
.     if 'x1' >= $xMax {
 32. * DEBUGGING
. *     di "Null case"
.       qui replace SC = SC + 'p' * SB
 33.     }
 34.     else {
 35.       if 'u3' <= 0 {
 36. * Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
. * DEBUGGING
. *       di "Case A"
.         qui replace SC = SC + 'p' * SBr3
 37.       }
 38.       else {
 39.         if 'u3' > 0 & 'u2' <= 0 {
 40. *       di "Case B"
. * Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
. * DEBUGGING
.           qui replace SC = SC + 'p' * SBr2 in 1/'u3'
 41.           if 'v3' <= $N {
 42.             qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
 43.           }
 44.         }
 45.         else {
 46.           if 'u2' > 0 & 'u1' <= 0 {
 47. * Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
. *       di "Case C"
.             qui replace SC = SC + 'p' * SBr1 in 1/'u2'
 48.             if 'v2' <= 'u3' {
 49.               qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
 50.             }
 51.             if 'v3' <= $N {
 52.               qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
 53.             }
 54.           }
 55.           else {
 56. * Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
```

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```
. *     di "Case D"
          qui replace SC = SC + 'p' * SB in 1/'u1'
 57.          qui replace SC = SC + 'p' * SBr1 * 'A1' in 'u1'/'u2'
 58.          if 'v2' <= 'u3' {
 59.            qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'u2'/'u3'
 60.          }
 61.          if 'v3' <= SN {
 62.            qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3
> '/SN
 63.          }
 64.        }
 65.      }
 66.    }
 67.  }
 68.
      local i = 'i' + 1
 69.   }
 70.  * Lifetime probability of not smoking by age $xMax in CF scenario
    global PC = SC[SN]
 71.  * Conditional survival curve in CF scenario
    tempvar SC_
 72.    qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
 73.    qui sum 'SC_'
 74.  * Mean age started among those starting by age $xMax in CF scenario
    global XC = $xMin + r(mean)*$N
 75.    di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3
> f $PC - $PB, %7.2f $XB - $XC
 76  end

. prog def rangeSC
  1.   di "      T1        T2        T3        r1        r2        r3    deltaP deltaX"
  2.   getSC 1954 1963 2001 1.0 1.0 1.0
  3.   getSC 1954 1963 2001 1.0 0.9 1.0
  4.   getSC 1954 1963 2001 1.0 0.8 1.0
  5.   qui gen FC_lo = 1 - SC
  6.   lab var FC_lo "FC (no post-2000 Misconduct) low est."
  7.   getSC 1954 1963 2001 1.0 0.8 0.8
  8.   qui gen FC7lo = 1 - SC
  9.   lab var FC7lo "FC (post-2000 Misconduct) low est."
 10.   getSC 1954 1963 2001 1.0 0.7 1.0
 11.   getSC 1954 1963 2001 1.0 0.6 1.0
 12.   getSC 1954 1963 2001 0.9 0.9 1.0
 13.   getSC 1954 1963 2001 0.9 0.8 1.0
 14.
.   ******Wecker Change: replace 0.7 with 1.0******
.
.   *getSC 1954 1963 2001 0.9 0.7 1.0
.    getSC 1954 1963 2001 0.9 1.0 1.0
 15.
.   **************End Wecker Change***********
.
.   qui gen FC_ = 1 - SC
 16.   lab var FC_ "FC (no post-2000 Misconduct) mid est."
 17.   getSC 1954 1963 2001 0.9 0.7 0.7
 18.   qui gen FC7 = 1 - SC
 19.   lab var FC7 "FC (post-2000 Misconduct) mid est."
 20.   getSC 1954 1963 2001 0.9 0.6 1.0
 21.   getSC 1954 1963 2001 0.8 0.8 1.0
 22.   getSC 1954 1963 2001 0.8 0.7 1.0
 23.   getSC 1954 1963 2001 0.8 0.6 1.0
 24.   qui gen FC_hi = 1 - SC
 25.   lab var FC_hi "FC (no post-2000 Misconduct) high est."
 26.   getSC 1954 1963 2001 0.8 0.6 0.6
 27.   qui gen FC7hi = 1 - SC
 28.   lab var FC7hi "FC (post-2000 Misconduct) high est."
 29.
end

. rangeSC
      T1      T2      T3      r1      r2      r3   deltaP deltaX
    1954    1963    2001     1.0     1.0     1.0    0.000   0.00
    1954    1963    2001     1.0     0.9     1.0    0.022  -0.02
    1954    1963    2001     1.0     0.8     1.0    0.046  -0.03
    1954    1963    2001     1.0     0.8     0.8    0.046   0.00
    1954    1963    2001     1.0     0.7     1.0    0.073  -0.01
    1954    1963    2001     1.0     0.6     1.0    0.103   0.03
    1954    1963    2001     0.9     0.9     1.0    0.030  -0.14
    1954    1963    2001     0.9     0.8     1.0    0.055  -0.15
    1954    1963    2001     0.9     1.0     1.0    0.008  -0.12
    1954    1963    2001     0.9     0.7     0.7    0.083  -0.09
    1954    1963    2001     0.9     0.6     1.0    0.113  -0.10
    1954    1963    2001     0.8     0.8     1.0    0.064  -0.28
    1954    1963    2001     0.8     0.7     1.0    0.092  -0.27
    1954    1963    2001     0.8     0.6     1.0    0.124  -0.23
    1954    1963    2001     0.8     0.6     0.6    0.126  -0.15

.
. qui gen FB = 1 - SB

. * Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
. gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumula
> tive Proportion Who Have Begun to Smoke")saving(nir5a,replace)
(Note: file nir5a.gph not found)

. gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumul
> ative Proportion Who Have Begun to Smoke")saving(nir5b,replace)
(Note: file nir5b.gph not found)

. keep x F*

. form x %6.0f

. form F* %7.3f

. save nir5_r2, replace
(Note: file nir5_r2.dta not found)
file nir5_r2.dta saved

. * List data
. l,nod
```

	x	FC_lo	FC7lo	FC_	FC7	FC_hi	FC7hi	FB
1.	9	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.	10	0.022	0.022	0.021	0.021	0.019	0.019	0.022
3.	11	0.029	0.029	0.029	0.027	0.026	0.026	0.030
4.	12	0.040	0.040	0.040	0.038	0.036	0.036	0.041
5.	13	0.055	0.055	0.055	0.052	0.049	0.049	0.057
6.	14	0.080	0.080	0.080	0.075	0.070	0.070	0.083
7.	15	0.122	0.122	0.124	0.115	0.107	0.107	0.128
8.	16	0.186	0.186	0.190	0.174	0.162	0.162	0.196
9.	17	0.245	0.245	0.252	0.230	0.214	0.214	0.260
10.	18	0.326	0.326	0.337	0.305	0.284	0.284	0.347
11.	19	0.384	0.384	0.399	0.360	0.335	0.335	0.409
12.	20	0.454	0.454	0.474	0.427	0.397	0.397	0.485
13.	21	0.501	0.501	0.523	0.471	0.439	0.439	0.534
14.	22	0.529	0.529	0.554	0.498	0.465	0.465	0.565
15.	23	0.549	0.549	0.575	0.518	0.483	0.483	0.586

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16.	24	0.568	0.568	0.595	0.535	0.499	0.499	0.605
17.	25	0.585	0.585	0.614	0.552	0.515	0.515	0.624
18.	26	0.600	0.600	0.630	0.566	0.529	0.529	0.640
19.	27	0.614	0.614	0.644	0.579	0.541	0.541	0.654
20.	28	0.622	0.622	0.654	[illegible]	[illegible]	[illegible]	[illegible]
21.	29	0.629	0.629	0.661	[illegible]	[illegible]	[illegible]	0.671
22.	30	0.641	0.641	0.674	0.600	0.566	0.566	[illegible]
23.	31	0.648	0.648	0.681	0.613	0.573	0.573	0.691
24.	32	0.655	0.655	0.689	0.619	0.579	0.579	0.698
25.	33	0.662	0.662	0.696	0.626	0.585	0.585	0.705
26.	34	0.669	0.669	0.704	0.633	0.593	0.592	0.713
27.	35	0.675	0.675	0.711	0.639	0.598	0.598	0.720
28.	36	0.679	0.679	0.715	0.643	0.602	0.602	0.724
29.	37	0.682	0.682	0.718	0.645	0.604	0.604	0.727
30.	38	0.685	0.685	0.722	0.649	0.608	0.608	0.730
31.	39	0.687	0.687	0.724	0.651	0.609	0.509	0.732
32.	40	0.695	0.695	0.732	0.658	0.616	0.616	0.740
33.	41	0.697	0.697	0.735	0.660	0.619	[illegible]	0.743
34.	42	0.699	0.699	0.736	0.662	0.620	[illegible]	0.744
35.	43	0.700	0.700	0.737	0.663	0.621	[illegible]	0.746
36.	44	0.701	0.701	0.739	0.664	0.622	[illegible]	0.747
37.	45	0.704	0.704	0.742	0.667	0.625	0.625	0.750
38.	46	0.706	0.706	0.744	0.669	0.627	0.627	0.752
39.	47	0.708	0.707	0.746	0.670	0.629	0.628	0.754
40.	48	0.708	0.707	0.746	0.670	0.629	0.628	0.754
41.	49	0.709	0.709	0.747	0.672	0.630	0.629	0.755
42.	50	0.711	0.711	0.749	0.674	0.633	0.631	0.757

```
.
. * Compute changes in proportion who ever smoked
. global N = _N

. * Baseline scenario:
. di %9.3f FB[$N]
    0.757

. prog def Results
  1.  di "---        Decrease in proportion smoked       ---"
  2.  di "Post-2000          Low         Middle         High"
  3.  di "Misconduct         Est.         Est.          Est."
  4.  di " Yes    ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[
> $N] - FC7hi[$N]
  5.  di " No     ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[
> $N] - FC_hi[$N]
  6. end

. Results
---        Decrease in proportion smoked       ---
Post-2000          Low         Middle         High
Misconduct         Est.         Est.          Est.
 Yes              0.046        0.083         0.126
 No               0.046        0.008         0.124

.
.
. log close
```

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nir6_r2.do

```
* ®RM500
* nir6: BL-CF differences in proportion of ever-smokers and
* mean smoke-years exposure of claimants in HRA audit files
* Relative risk initiation model hC(t) = r1*hB(t) if year >= T1
* hC(t) = r2*hB(t) if year >= T2, where T2 >= T1
* hC(t) = r3*hB(t) if year >= T3, where T3 >= T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* T2 = max(T2,ylexp), T3 = max(T3,ylexp) Relative reduction r2 in
* initiation rate begins only after start of employment/exposure to asbestos

* Crossover insulators excluded
* Scenario     pre-88 misconduct     Estimate     r1     r2     r3
*    BL              -                   -        1.0    1.0    1.0
*    CF             yes                 low       1.0    0.8    1.0
*    CF             yes                 mid       0.9    0.7    1.0
*    CF             yes                 high      0.8    0.6    1.0
*
* Input files: (nir) concatenated HR&A audit samples (from nir1)

clear
prog drop _all
set rmsg off
set more off
set matsize 200


log using nir6, replace
use nir, clear

* (1) Save distribution of yrborn in Matrix pi(t)
* Exclude observations for which yrBegan was imputed in nir1.do
drop if iBegin == 0
* Exclude observations for which date of first exposure to asbestos unknown
drop if Ylexp == .
qui tab yrborn [w=w], matcell(pi) matrow(t_)
matrix pi = pi/_result(1)
matrix pi = t_, pi
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix drop t_
* Distribution of year of birth
matrix list pi

* Tabulate year first exposed to asbestos
tab Ylexp [w=w], missing
qui gen byte smk_exp = yrBegin < Ylexp
lab var smk_exp "Began smoking before 1st employment with asbestos
tab smk_exp [w=w]

* (2) Set up duration variable for initiation analysis
gen int ageEnd = ageBegin
replace ageEnd = yrDied - yrborn if ageEnd == .
replace ageEnd = yrSett - yrborn if ageEnd == .
replace ageEnd = yrRecv - yrborn if ageEnd == .
gen byte smoked = Smoker == 1

* (3) Compute initation survival curve
stset ageEnd [w=w], failure(Smoker) origin(time 0) scale(1) id(poc)
sts generate SB = s
form SB %9.3f
gen byte x = _t
lab var x "Age"
gen FB = 1 - SB
form FB %9.3f
lab var FB "Cumul prop started smoking (BL)"
sort x
drop if x == x[_N]
global N = _N + 1
set obs $N
qui sum x
global xMin = r(min) - 1
replace x = $xMin in $N
replace FB = 0. in $N
replace SB = 1. in $N
sort x
form FB %9.0g
gr FB x if x<=50, xlab(10,15,20,25,30,35,40,45,50)ylab(0,.25,.5,.75,1)s(i)c(J)saving(nir3
a,replace)
form FB %9.3f
l x FB if x<=50

* (4) Computation of initiation rates in CF scenario
* Cutoff years for decrease in initiation rates are $T1 and max($T2,Ylexp)
* Relative decrease in initiation rate (on or after year T1) is global variable $r1
* Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global variable $r
2
* Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global variable $r
3

* SB(x) cumulative proportion not smoking through age x in BL scenario.
keep SB x Ylexp

sort x
order x SB
* Set xMax
* Age 50 set as cutoff for ever smoking
global xMax = 50
drop if x > $xMax
qui sum x
global xMin = r(min)
global N = _N

* Lifetime probability of not smoking by age $xMax in BL scenario
  global PB = SB[$N]
* Conditional survival curve in BL scenario
  qui gen SB_ = 1 - (1 - SB)/(1 - $PB)
  qui sum SB_
* Mean age started among those starting by age $xMax in BL scenario
  global XB = $xMin + r(mean)*$N
  di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
  di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
  drop SB_


* SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
qui gen SBr1 = .
qui gen SBr2 = .
qui gen SBr3 = .
gen SC = .

prog def getSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global r1 = $_4
  global r2 = $_5
  global r3 = $_6
```

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nir6_r2.do

```
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }

* Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
  qui replace SBr1 = SB^$r1
  qui replace SBr2 = SB^$r2
  qui replace SBr3 = SB^$r3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t))^(r1-r2)*SB(m
in(x,T3-t))^(r2-r3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
    local p = pi['i',2]
*    'x1' = age at T1
    local x1 = $T1 - 't'
*    'x2' = age at T2
*   local x2 = min($T2 - 't',$xMax)
*    'x2' = age at max(T2,Ylexp) (later of $T2 and year 1st exposed)
    local x2 = max($T2,Ylexp) - 't'
    local x2 = min('x2', $xMax)

*    'x3' = age at T3
*   local x3 = min($T3 - 't',$xMax)
    local x3 = max($T3,Ylexp) - 't'
    local x3 = min('x3', $xMax)

* Note: x3 >= x2 >= x1
*      'v1' = obs# at age at T1
      local u1 = 'x1' - $xMin
      local v1 = 'x1' - $xMin + 1
*      'v2' = obs# at age at T2
      local u2 = 'x2' - $xMin
      local v2 = 'x2' - $xMin + 1
*      'v3' = obs# at age at T3
      local u3 = 'x3' - $xMin
      local v3 = 'x3' - $xMin + 1
* Note: u3 >= u2 >= u1
      local A1 = SB['u1']^(1-$r1)
      local A2 = SB['u2']^($r1-$r2)
      local A3 = SB['u3']^($r2-$r3)
* DEBUGGING
*      di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1', 'u2', 'u3
',"v1,v2,v3= ", 'v1', 'v2', 'v3'
*   Null Case:
    if 'x1' >= $xMax {
* DEBUGGING
*     di "Null case"
      qui replace SC = SC + 'p' * SB
    }
    else {
      if 'u3' <= 0 {
* Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
* DEBUGGING
*       di "Case A"
          qui replace SC = SC + 'p' * SBr3
        }
        else {
          if 'u3' > 0 & 'u2' <= 0 {
*       di "Case B"
* Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
* DEBUGGING
            qui replace SC = SC + 'p' * SBr2 in 1/'u3'
            if 'v3' <= $N {
              qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
            }
          }
          else {
            if 'u2' > 0 & 'u1' <= 0 {
* Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*             di "Case C"
              qui replace SC = SC + 'p' * SBr1 in 1/'u2'
              if 'v2' <= 'u3' {
                qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
              }
              if 'v3' <= $N {
                qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
              }
            }
            else {
* Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*             di "Case D"
              qui replace SC = SC + 'p' * SB in 1/'u1'
              qui replace SC = SC + 'p' * SBr1 * 'A1' in 'v1'/'u2'
              if 'v2' <= 'u3' {
                qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'v2'/'u3'
              }
              if 'v3' <= $N {
                qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3'/$N
              }
            }
          }
        }
      }

    local i = 'i' + 1
  }
* Lifetime probability of not smoking by age $xMax in CF scenario
  global PC = SC[$N]
* Conditional survival curve in CF scenario
  tempvar SC_
  qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
  qui sum 'SC_'
* Mean age started among those starting by age $xMax in CF scenario
  global XC = $xMin + r(mean)*$N
  di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3f $PC - $PB, %7
.2f $XB - $XC
end

prog def rangeSC
  di "      T1      T2      T3      r1      r2      r3   deltaP deltaX"
  getSC 1954 1963 2001 1.0 1.0 1.0
  getSC 1954 1963 2001 1.0 0.9 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  qui gen FC_lo = 1 - SC
  lab var FC_lo "FC (no post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.8 0.8
  qui gen FC7lo = 1 - SC
  lab var FC7lo "FC (post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.7 1.0
  getSC 1954 1963 2001 1.0 0.6 1.0
  getSC 1954 1963 2001 0.9 0.9 1.0
  getSC 1954 1963 2001 0.9 0.8 1.0
```


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nir6_r2.do

```
***Wecker Change: replace 0.7 with 1.0*******

  *getSC 1954 1963 2001 0.9 0.7 1.0
   getSC 1954 1963 2001 0.9 1.0 1.0

***********End Wecker Change***********
  qui gen FC_ = 1 - SC
  lab var FC_ "FC (no post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.7 0.7
  qui gen FC7 = 1 - SC
  lab var FC7 "FC (post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.6 1.0
  getSC 1954 1963 2001 0.8 0.8 1.0
  getSC 1954 1963 2001 0.8 0.7 1.0
  getSC 1954 1963 2001 0.8 0.6 1.0
  qui gen FC_hi = 1 - SC
  lab var FC_hi "FC (no post-2000 Misconduct) high est."
  getSC 1954 1963 2001 0.8 0.6 0.6
  qui gen FC7hi = 1 - SC
  lab var FC7hi "FC (post-2000 Misconduct) high est."

end

tangeSC

qui gen FB = 1 - SB
* Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumulative Propor
tion Who Have Begun to Smoke")saving(nir6a,replace)
gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumulative Propo
rtion Who Have Begun to Smoke")saving(nir6b,replace)
keep x F*
form x %6.0f
form F* %7.3f
save nir6_r2, replace
* List data
l,nod

* Compute changes in proportion who ever smoked
global N = _N
* Baseline scenario:
di %9.3f FB($N)
prog def Results
 di "---       Decrease in proportion smoked     ---"
 di "Post-2000          Low         Middle        High"
 di "Misconduct         Est.        Est.          Est."
 di " Yes    ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[$N] - FC7hi[$N
]
 di " No     ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[$N] - FC_hi[$N
]
end
Results

log close
\032
```

nir6.log

```
. use nir, clear

. * (1) Save distribution of yrborn in Matrix pi(t)
. * Exclude observations for which yrBegin was imputed in nir6.de
. drop if iBegin == 0
(193 observations deleted)

. * Exclude observations for which date of first exposure to asbestos unknown
. drop if Ylexp == .
(47 observations deleted)

. qui tab yrborn [w=w], matcell(pi) matrow(t_)

. matrix pi = pi/_result(1)

. matrix pi = t_, pi

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix drop t_

. * Distribution of year of birth
. matrix list pi

pi[64,2]
```

	t	pi(t)
r1	1896	.00018528
r2	1897	.00014319
r3	1898	.0001936
r4	1900	.00063647
r5	1901	.00113331
r6	1902	.00016957
r7	1903	.00113415
r8	1904	.00063443
r9	1905	.00281819
r10	1906	.00332298
r11	1907	.00449854
r12	1908	.00365987
r13	1909	.00763218
r14	1910	.00601509
r15	1911	.00871055
r16	1912	.00815244
r17	1913	.0137759
r18	1914	.01685662
r19	1915	.01611698
r20	1916	.01891755
r21	1917	.02051612
r22	1918	.02706036
r23	1919	.02981462
r24	1920	.02726175
r25	1921	.03644682
r26	1922	.03416953
r27	1923	.03654592
r28	1924	.03229662
r29	1925	.04102194
r30	1926	.03281913
r31	1927	.0487059
r32	1928	.04231479
r33	1929	.02749656
r34	1930	.02990647
r35	1931	.02959857
r36	1932	[illegible]
[illegible]	1933	[illegible]
[illegible]	1934	[illegible]
[illegible]	1935	[illegible]
r40	1936	[illegible]
r41	1937	.02655839
r42	1938	.02412411
r43	1939	.02616626
r44	1940	.02094601
[illegible]	1941	.01744799
[illegible]	1942	.02677041
[illegible]	1943	.01544061
r48	1944	.01626907
r49	1945	.01590855
r50	1946	.01662858
[illegible]	1947	[illegible]
[illegible]	1948	[illegible]
r53	1949	[illegible]
r54	1950	[illegible]
r55	1951	.00809841
r56	1952	.00559396
r57	1953	.00404073
r58	1954	.00267647
r59	1955	.0015045
r60	1956	.00106411
r61	1957	.00056056
r62	1958	.00045207
r63	1959	.0008493
r64	1965	.00045207

```
. * Tabulate year first exposed to asbestos
. tab Ylexp [w=w], missing
(frequency weights assumed)
```

Year 1st Exposed to Asbestos	Freq.	Percent	Cum.
1912	986	0.00	0.00
1916	290	0.00	0.00
1920	40840	0.14	0.14
1921	3110	0.01	0.15
1922	19809	0.07	0.22
1923	56285	0.19	0.41
1924	8718	0.03	0.44
1925	36357	0.12	0.56
1926	23378	0.08	0.64
1927	19837	0.07	0.70
1928	42169	0.14	0.84
1929	39256	0.13	0.98
1930	34287	0.12	1.09
1931	57118	0.19	1.28
1932	34116	0.11	1.40
1933	101397	0.34	1.74
1934	109712	0.37	2.11
1935	198040	0.66	2.77
1936	271812	0.91	3.68
1937	323316	1.09	4.77
1938	264281	0.89	5.66
1939	421068	1.41	7.07
1940	999414	3.35	10.42
1941	1236684	4.15	14.57

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nir6.log

```
     1942 |    1283368       4.31      18.88
     1943 |    1198442       4.02      22.90
     1944 |     702165       2.36      25.26
     1945 |    1011878       3.40      [illegible]
     1946 |    1189366       3.99      [illegible]
     1947 |     976726       3.28      [illegible]
     1948 |    1080973       3.63      39.55
     1949 |     608863       2.04      41.59
     1950 |     889106       2.98      44.58
     1951 |    1196194       4.01      48.59
     1952 |    1257412       4.22      52.81
     1953 |     978183       3.28      56.09
     1954 |     500674       1.68      57.77
     1955 |     920743       3.09      60.86
     1956 |     661422       2.22      63.08
     1957 |     680420       2.28      65.37
     1958 |     822919       2.76      68.13
     1959 |     801776       2.69      70.82
     1960 |     617207       2.07      72.89
     1961 |     437519       1.47      74.36
     1962 |     668138       2.24      76.60
     1963 |     605962       2.03      78.63
     1964 |     928567       3.12      81.75
     1965 |    1013328       3.40      85.15
     1966 |     879274       2.95      88.10
     1967 |     542736       1.82      89.92
     1968 |     634357       2.13      92.05
     1969 |     524800       1.76      93.81
     1970 |     460072       1.54      95.36
     1971 |     294009       0.99      96.34
     1972 |     331490       1.11      97.46
     1973 |     275810       0.93      98.38
     1974 |     227880       0.76      99.15
     1975 |      68952       0.23      99.38
     1976 |      36228       0.12      99.50
     1977 |      29142       0.10      99.60
     1978 |       5540       0.02      99.62
     1979 |      45593       0.15      99.77
     1980 |      30175       0.10      99.87
     1985 |      13471       0.05      99.92
     1988 |      25308       0.08     100.00
------------+-----------------------------------
      Total |   29798568     100.00

. qui gen byte smk_exp = yrBegin < Y1exp

. lab var smk_exp "Began smoking before 1st employment with asbestos

. tab smk_exp [w=w]
(frequency weights assumed)

      Began |
    smoking |
 before 1st |
 employment |
       with |
   asbestos |      Freq.     Percent        Cum.
------------+-----------------------------------
          0 |   15219351       51.07       51.07
          1 |   14579217       48.93      100.00
------------+-----------------------------------
      Total |   29798568      100.00

.
. * (2) Set up duration variable for initiation analysis

. gen int ageEnd = ageBegin
(601 missing values generated)

. replace ageEnd = yrDied - yrborn if ageEnd == .
(0 real changes made)

. replace ageEnd = yrSett - yrborn if ageEnd == .
(524 real changes made)

. replace ageEnd = yrRecv - yrborn if ageEnd == .
(77 real changes made)

. gen byte smoked = Smoker == 1

.
. * (3) Compute initation survival curve
. stset ageEnd [fw=w], failure(Smoker) origin(time 0) scale(1) id(poc)
(frequency weights assumed)

                id:  poc
     failure event:  Smoker ~= 0 & Smoker ~= .
obs. time interval:  (ageEnd[_n-1], ageEnd]
 exit on or before:  failure
            weight:  [fweight=w]

------------------------------------------------------------------------------
     3881  total obs.
        0  exclusions
------------------------------------------------------------------------------
     3881  physical obs. remaining, equal to
 2.98e+07  weighted obs., representing
 2.98e+07  subjects
 2.28e+07  failures in single failure-per-subject data
 9.49e+08  total analysis time at risk, at risk from t =         0
                             earliest observed entry t =         0
                                  last observed exit t =        95

. sts generate SB = s

. form SB %9.3f

. gen byte x = _t

. lab var x "Age"

. gen FB = 1 - SB

. form FB %9.3f

. lab var FB "Cumul prop started smoking (BL)"

. sort x

. drop if x == x[_n-1]
(3796 observations deleted)

. global N = _N + 1

. set obs $N
obs was 85, now 86

. qui sum x

. global xMin = r(min) - 1
```

nir6.log

```
. replace x = $xMin in $N
(1 real change made)

. replace FB = 0. in $N
(1 real change made)

. replace SB = 1. in $N
(1 real change made)

. sort x

. form FB %9.0g

. gr FB x if x<=50, xlab(10,15,20,25,30,35,40,45,50)ylab(0,.25,.5,.75,1)s(i)c(J
> )saving(nir3a,replace)

. form FB %9.3f

. l x FB if x<=50

          x        FB
  1.      9     0.000
  2.     10     0.022
  3.     11     0.030
  4.     12     0.041
  5.     13     0.057
  6.     14     0.083
  7.     15     0.128
  8.     16     0.196
  9.     17     0.260
 10.     18     0.347
 11.     19     0.409
 12.     20     0.485
 13.     21     0.534
 14.     22     0.565
 15.     23     0.586
 16.     24     0.605
 17.     25     0.624
 18.     26     0.640
 19.     27     0.654
 20.     28     0.664
 21.     29     0.671
 22.     30     0.684
 23.     31     0.691
 24.     32     0.698
 25.     33     0.705
 26.     34     0.713
 27.     35     0.720
 28.     36     0.724
 29.     37     0.727
 30.     38     0.730
 31.     39     0.732
 32.     40     0.740
 33.     41     0.743
 34.     42     0.744
 35.     43     0.746
 36.     44     0.747
 37.     45     0.750
 38.     46     0.752
 39.     47     0.754
 40.     48     0.754
 41.     49     0.755
 42.     50     0.757

. * (4) Computation of initation rates in CF scenario
. * Cutoff years for decrease in initiation rates are $T1 and max($T2,Ylexp)
. * Relative decrease in initiation rate (on or after year T1) is global variab
> le $r1
. * Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global
>  variable $r2
. * Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global
>  variable $r3

. * SB(x) cumulative proportion not smoking through age x in BL scenario.
. keep SB x Ylexp

. sort x

. order x SB

. * Set xMax
. * Age 50 set as cutoff for ever smoking
. global xMax = 50

. drop if x > $xMax
(44 observations deleted)

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * Lifetime probability of not smoking by age $xMax in BL scenario
.   global PB = SB[$N]

. * Conditional survival curve in BL scenario
.   qui gen SB_ = 1 - (1 - SB)/(1 - $PB)

.   qui sum SB_

. * Mean age started among those starting by age $xMax in BL scenario
.   global XB = $xMin + r(mean)*$N

.   di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
Probability of not smoking (by age 50) =    0.243

.   di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
Mean age started (among those starting by age 50) =     20.7

.   drop SB_

.
.
. * SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
. qui gen SBr1 = .

. qui gen SBr2 = .

. qui gen SBr3 = .

. gen SC = .
(42 missing values generated)

.
. prog def getSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
```


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```
.   global T1 = $_1
 2.   global T2 = $_2
 3.   global T3 = $_3
 4.   global r1 = $_4
 5.   global r2 = $_5
 6.   global r3 = $_6
 7. * Check T3 > T2 > T1
.   if $T2 <= $T1 | $T3 <= $T2 {
 8.      di "Invalid ",%9.0f $T1,$T2,$T3
 9.      exit
10.     }
11.
. * Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
.   qui replace SBr1 = SB^$r1
12.   qui replace SBr2 = SB^$r2
13.   qui replace SBr3 = SB^$r3
14.   qui replace SC = 0
15. * Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(r1-r2)*SB(min(x,T2-t)
> )^(r1-r2)*SB(min(x,T3-t))^(r2-r3) for all x
. * Sum over index 'i' (rows of pi)
.   local i = 1
16.   while 'i' <= $m {
17.      local t = pi['i',1]
18.      local p = pi['i',2]
19. *    'x1' = age at T1
.     local x1 = $T1 - 't'
20. *    'x2' = age at T2
. *   local x2 = min($T2 - 't',$xMax)
. *   'x2' = age at max(T2,Ylexp) (later of $T2 and year 1st exposed)
.     local x2 = max($T2,Ylexp) - 't'
21.      local x2 = min('x2', $xMax)
22.
. *   'x3' = age at T3
. *   local x3 = min($T3 - 't',$xMax)
.     local x3 = max($T3,Ylexp) - 't'
23.      local x3 = min('x3', $xMax)
24.
. * Note: x3 >= x2 >= x1
. *      'v1' = obs# at age at T1
.        local u1 = 'x1' - $xMin
25.        local v1 = 'x1' - $xMin + 1
26. *      'v2' = obs# at age at T2
.        local u2 = 'x2' - $xMin
27.        local v2 = 'x2' - $xMin + 1
28. *      'v3' = obs# at age at T3
.        local u3 = 'x3' - $xMin
29.        local v3 = 'x3' - $xMin + 1
30. * Note: u3 >= u2 >= u1
.        local A1 = SB['u1']^(1-$r1)
31.        local A2 = SB['u2']^($r1-$r2)
32.        local A3 = SB['u3']^($r2-$r3)
33. * DEBUGGING
. *      di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1'
> , 'u2', 'u3',"v1,v2,v3= ", 'v1', 'v2', 'v3'
. *    Null Case:
.      if 'x1' >= $xMax {
34. * DEBUGGING
. *      di "Null case"
.        qui replace SC = SC + 'p' * SB
35.       }
36.       else {
37.         if 'u3' <= 0 {
38. * Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
. * DEBUGGING
. *      di "Case A"
.          qui replace SC = SC + 'p' * SBr3
39.        }
40.        else {
41.          if 'u3' > 0 & 'u2' <= 0 {
42. *      di "Case B"
. * Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
. * DEBUGGING
.           qui replace SC = SC + 'p' * SBr2 in 1/'u3'
43.           if 'v3' <= $N {
44.             qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
45.           }
46.         }
47.         else {
48.           if 'u2' > 0 & 'u1' <= 0 {
49. * Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
. *      di "Case C"
.             qui replace SC = SC + 'p' * SBr1 in 1/'u2'
50.             if 'v2' <= 'u3' {
51.               qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
52.             }
53.             if 'v3' <= $N {
54.               qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
55.             }
56.           }
57.           else {
58. * Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
. *      di "Case D"
.             qui replace SC = SC + 'p' * SB in 1/'u1'
59.             qui replace SC = SC + 'p' * SBr1 * 'A1' in 'v1'/'u2'
60.             if 'v2' <= 'u3' {
61.               qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'v2'/'u3'
62.             }
63.             if 'v3' <= $N {
64.               qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3
> '/$N
65.             }
66.           }
67.         }
68.       }
69.     }
70.
.     local i = 'i' + 1
71.   }
72. * Lifetime probability of not smoking by age $xMax in CF scenario
.   global PC = SC[$N]
73. * Conditional survival curve in CF scenario
.   tempvar SC_
74.   qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
75.   qui sum 'SC_'
76. * Mean age started among those starting by age $xMax in CF scenario
.   global XC = $xMin + r(mean)*$N
77.   di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3
> f $PC - $PB, %7.2f $XB - $XC
78. end

.
. prog def rangeSC
 1.   di "      T1      T2      T3      r1      r2      r3   deltaP deltaX"
 2.   getSC 1954 1963 2001 1.0 1.0 1.0
 3.   getSC 1954 1963 2001 1.0 0.9 1.0
 4.   getSC 1954 1963 2001 1.0 0.8 1.0
 5.   qui gen FC_lo = 1 - SC
 6.   lab var FC_lo "FC (no post-2000 Misconduct) low est."
```

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```
 7.   getSC 1954 1963 2001 1.0 0.8 0.8
 8.   qui gen FC7lo = 1 - SC
 9.   lab var FC7lo "FC (post-2000 Misconduct) low est."
10.   getSC 1954 1963 2001 1.0 0.7 1.0
11.   getSC 1954 1963 2001 1.0 0.6 1.0
12.   getSC 1954 1963 2001 0.9 0.9 1.0
13.   getSC 1954 1963 2001 0.9 0.8 1.0
14.
. ****Wecker Change: replace 0.7 with 1.0*******

.   *getSC 1954 1963 2001 0.9 0.7 1.0
     getSC 1954 1963 2001 0.9 1.0 1.0
15.
. ************End Wecker Change************

.   qui gen FC_ = 1 - SC
16.   lab var FC_ "FC (no post-2000 Misconduct) mid est."
17.   getSC 1954 1963 2001 0.9 0.7 0.7
18.   qui gen FC7 = 1 - SC
19.   lab var FC7 "FC (post-2000 Misconduct) mid est."
20.   getSC 1954 1963 2001 0.9 0.6 1.0
21.   getSC 1954 1963 2001 0.8 0.8 1.0
22.   getSC 1954 1963 2001 0.8 0.7 1.0
23.   getSC 1954 1963 2001 0.8 0.6 1.0
24.   qui gen FC_hi = 1 - SC
25.   lab var FC_hi "FC (no post-2000 Misconduct) high est."
26.   getSC 1954 1963 2001 0.8 0.6 0.6
27.   qui gen FC7hi = 1 - SC
28.   lab var FC7hi "FC (post-2000 Misconduct) high est."
29.
. end
```

remove asbestos - specific initiation rate effect (past)

. rangeSC

T1	T2	T3	r1	r2	r3	deltaP	deltaX
1954	1963	2001	1.0	1.0	1.0	0.000	0.00
1954	1963	2001	1.0	0.9	1.0	0.008	0.06
1954	1963	2001	1.0	0.8	1.0	0.017	0.13
1954	1963	2001	1.0	0.8	0.8	0.018	0.15
1954	1963	2001	1.0	0.7	1.0	0.027	0.21
1954	1963	2001	1.0	0.6	1.0	0.037	0.30
1954	1963	2001	0.9	0.9	1.0	0.016	0.03
1954	1963	2001	0.9	0.8	1.0	0.025	0.10
1954	1963	2001	0.9	1.0	1.0	0.008	-0.04
1954	1963	2001	0.9	0.7	0.7	0.036	0.21
1954	1963	2001	0.9	0.6	1.0	0.046	0.28
1954	1963	2001	0.8	0.8	1.0	0.034	0.07
1954	1963	2001	0.8	0.7	1.0	0.045	0.15
1954	1963	2001	0.8	0.6	1.0	0.056	0.25
1954	1963	2001	0.8	0.6	0.6	0.057	0.30

```
. qui gen FB = 1 - SB

. * Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
. gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumula
> tive Proportion Who Have Begun to Smoke")saving(nir6a,replace)
(Note: file nir6a.gph not found)

. gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumul
> ative Proportion Who Have Begun to Smoke")saving(nir6b,replace)
(Note: file nir6b.gph not found)

. keep x F*

. form x %6.0f

. form F* %7.3f

. save nir6_r2, replace
(note: file nir6_r2.dta not found)
file nir6_r2.dta saved

. * List data
. l,nod
```

	x	FC_lo	FC7lo	FC_	FC7	FC_hi	FC7hi	FB
[illegible]	9	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.	10	0.022	0.022	0.022	0.022	0.022	0.022	0.022
3.	11	0.030	0.030	0.029	0.029	0.029	0.029	0.030
4.	12	0.041	0.041	0.041	0.041	0.040	0.040	0.041
5.	13	0.056	0.056	0.056	0.056	0.055	0.055	0.057
[illegible]	[illegible]	[illegible]	0.082	0.082	0.081	0.080	0.080	0.083
[illegible]	[illegible]	[illegible]	0.128	0.127	0.125	0.123	0.123	0.128
8.	[illegible]	[illegible]	0.195	0.194	0.191	0.187	0.187	0.196
9.	[illegible]	[illegible]	0.257	0.256	0.252	0.247	0.247	0.260
10.	18	0.343	0.343	0.342	0.336	0.328	0.328	0.347
11.	19	0.404	0.404	0.404	0.396	0.387	0.387	0.409
12.	20	0.478	0.478	0.478	0.468	0.457	0.457	0.485
13.	21	0.527	0.527	0.527	0.516	0.504	0.504	0.534
14.	22	0.557	0.557	0.558	0.545	0.532	0.532	0.565
15.	23	0.577	0.577	0.579	0.565	0.552	0.552	0.586
16.	24	0.596	0.596	0.598	0.584	0.570	0.570	0.605
17.	25	0.615	0.615	0.617	0.601	0.587	0.587	0.624
18.	26	0.630	0.630	0.632	0.616	0.601	0.601	0.640
19.	27	0.644	0.644	0.647	0.630	0.614	0.614	0.654
20.	28	0.653	0.653	0.656	0.638	0.622	0.622	0.664
21.	29	0.659	0.659	0.663	0.645	0.629	0.629	0.671
22.	30	0.672	0.672	0.676	0.657	0.640	0.640	0.684
23.	31	0.679	0.679	0.683	0.663	0.646	0.646	0.691
24.	32	0.686	0.686	0.690	0.670	0.653	0.653	0.698
25.	33	0.692	0.692	0.697	0.676	0.659	0.659	0.705
26.	34	0.700	0.700	0.705	0.684	0.665	0.665	0.713
27.	35	0.706	0.706	0.712	0.689	0.671	0.671	0.720
28.	36	0.710	0.710	0.716	0.693	0.674	0.674	0.724
29.	37	0.712	0.712	0.719	0.695	0.676	0.676	0.727
30.	38	0.716	0.716	0.722	0.699	0.679	0.679	0.730
31.	39	0.717	0.717	0.724	0.700	0.681	0.681	0.732
32.	40	0.725	0.725	0.732	0.707	0.687	0.687	0.740
33.	41	0.727	0.727	0.735	0.709	0.689	0.689	0.743
34.	42	0.728	0.728	0.736	0.710	0.690	0.690	0.744
35.	43	0.729	0.729	0.738	0.711	0.691	0.691	0.746
36.	44	0.731	0.731	0.739	0.712	0.692	0.692	0.747
37.	45	0.734	0.733	0.742	0.715	0.695	0.695	0.750
38.	46	0.735	0.735	0.744	0.717	0.696	0.696	0.752
39.	47	0.736	0.736	0.746	0.718	0.697	0.697	0.754
40.	48	0.736	0.736	0.746	0.718	0.697	0.697	0.754
41.	49	0.738	0.738	0.747	0.719	0.698	0.698	0.755
42.	50	0.740	0.739	0.749	0.721	0.701	0.700	0.757

```
. * Compute changes in proportion who ever smoked
. global N = _N

. * Baseline scenario:
. di %9.3f FB[$N]
    0.757

. prog def Results
  1.  di "---      Decrease in proportion smoked      ---"
```

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nir6.log

```
  2.  di "Post-2000          Low          Middle          High"
  3.  di "Misconduct         Est.          Est.            Est."
  4.  di " Yes     ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[
> $N] - FC7hi[$N]
  5.  di " No      ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[
> $N] - FC_hi[$N]
  6. end

. Results
---       Decrease in proportion smoked     ---
Post 2000          Low          Middle         High
Misconduct         Est.          Est.          Est.
 Yes              0.018         0.036         0.057
 No               0.017         0.008         0.056

.
. log close
```

nqr7_R2_R1.do

```
* @RM500
* nqr7: BL-CF differences in mean smoke-years exposure
* based upon empirical smoke-survival curve and mortality
* of claimants in HRA audit files (excluding Insulator crossovers)
* Relative risk quitting model hC(t) = R1*hB(t) if T2 > year >= T1
* hC(t) = R2*hB(t) if T3 > year >= T2, where T2 > T1
* hC(t) = R3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* Projection to future claimants based upon birth-year distribution pi()
* derived from age9.dta and distribution of ever-smokers by birth cohort
* from nir.dta

clear
prog drop _all
set matsize 400
set rmsg off
set more off

log using nqr7, replace

* Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
* Relative increase in quit rate (on or after year T1) is global variable $R1
* Relative increase in quit rate (on or after year T2) is global variable $R2
* Relative increase in quit rate (on or after year T3) is global variable $R3
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)

* (1a) get distribution of birth year of all future claimants from age9.dta
use age9
keep year AllFutur
mkmat year AllFutur
matrix pi = year,AllFutur
matrix drop year AllFutur
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix list pi
drop _all

* (1b) Compute ever-smoking prevalence by birth cohort from nir.dta
* Note: 'nir.dta' excludes Insulator crossovers
drop _all
use nir
keep coh Smok w
tab coh [w=w], sum(Smok)

* Matrix E holds ever-smoking prevalence by cohort
matrix E = (1880, 1909 \ 1910, 1919 \ 1920, 1929 \ 1930, 1939 \ 1940, 1971 )
matrix E = E, J(5,1,0)
matrix colnames E = t0 t1 Ever

prog def setE
  local i = 1
  while 'i' <= 5 {
    qui sum Smok [w=w] if coh == 'i'
    matrix E['i',3] = r(mean)
    local i =  'i' + 1
  }
end
setE
matrix li E

* (1c) Compute conditional distribn of birth year pi() among ever smokers
drop _all
svmat pi
ren pi1 t
ren pi2 pi
qui gen pi_ = .
form pi* %9.4f

prog def getpi
 local i = 1
 while 'i' <= 5 {
   replace pi_ = pi*E['i',3] if t >= E['i',1] & t <= E['i',2]
*  Note:  In CF with pre-1988 misconduct, ever-smoking prevalence
*  of 1940+ birth cohort will be reduced by 3.6%. (nir4.log),
*  but this feedback effect is very small.
   local i = 'i' + 1
 }
 qui sum pi_
 global sumPi = r(mean)*r(N)
 qui replace pi_ = pi_/$sumPi
end
getpi

* Replace pi_ in 2nd col of matrix pi()
mkmat pi_
matrix pi = pi[1..$m,1..1]
matrix pi = pi,pi_


* (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

drop _all
* Get L and SB from nqr4 output
use nqr4
qui sum x
global xMin = r(min)
global N = _N

* LSB is proportion who are still smoking and alive
gen LSB = L*SB
qui sum LSB
* EB is mean smoke-years taking mortality into account
global EB = r(mean)*$N
di "Mean smoke-years (BL) = ",%9.2f $EB
* LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
gen LSBR1 = .
gen LSBR2 = .
gen LSBR3 = .
gen SC = .

prog def LSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global R1 = $_4
  global R2 = $_5
  global R3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }
* Compute SB(x)^R1 and L(x)*SB(x)^R1
* Compute SB(x)^R2 and L(x)*SB(x)^R2
* Compute SB(x)^R3 and L(x)*SB(x)^R3
```

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nqr7_R2_R1.do

```
  qui replace LSBR1 = L*SB^$R1
  qui replace LSBR2 = L*SB^$R2
  qui replace LSBR3 = L*SB^$R3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*L(x)*SB(x)^[illegible]*SB(min(x,[illegible])^(1-R1)
* SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
*   't' year of birth
    local u1 = $T1 - 't' - $xMin - 1
    local v1 = 'u1' + 1
    local u2 = $T2 - 't' - $xMin - 1
    local v2 = 'u2' + 1
    local u3 = min($T3 - 't' - $xMin - 1,$N)
    local v3 = 'u3' + 1
*   Compute intermediate 'areas'
    local A1 = SB['u1']^(1-$R1)
    local A2 = SB['u2']^($R1-$R2)
    local A3 = SB['u3']^($R2-$R3)
*   'u3' > 'u2' > 'u1' required
*   Case A:
    if 'u3' <= 0 {
      qui replace SC = SC + pi['i',2] * LSBR3
    }
    else {
*   Case B:
     if 'u3' > 0 & 'u2' <= 0 {
       qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
       if 'v3' <= $N {
         qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
       }
     }
     else {
*   Case C:
       if 'u2' > 0 & 'u1' <= 0 {
         qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
         qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
         if 'v3' <= $N {
           qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/$N
         }
       }
       else {
*   Case D:
         qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
         qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
         qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u3'
         if 'v3' <= $N {
           qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' in 'v3'/$N
         }
       }
     }
    }
    local i = 'i' + 1
  }
  qui sum SC
  global EC = r(mean)*$N
  di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB,%8.2f $EC,%8.
2f $EB - $EC
end

prog def rangeSC
  di "      T1       T2       T3       R1       R2       R3       XB       XC   deltaX"
```

```
LSC 1954 1963 2001 1.0 2.1 1.0
qui gen SC_lo = SC
lab var SC_lo "SC (R=1 post-2000) low est."
LSC 1954 1963 [illegible]
LSC 1954 1963 [illegible]
LSC 1954 1963 [illegible]
LSC 1954 1963 [illegible]

LSC 1954 1963 2001 1.5 2.4 1.0

******Wecker Change: change 3.0 and 1.5 to 1.0******

*LSC 1954 1963 2001 1.5 3.0 1.0
 LSC 1954 1963 2001 1.0 1.0 1.0

*************End Wecker Change************

qui gen SC_[illegible]
lab var SC_[illegible] "SC (R=1 post-2000) middle est."
LSC 1954 1963 2001 [illegible] 3.0
qui gen SC3 = SC
lab var SC3 "SC (R=3 post-2000) middle est."

LSC 1954 1963 2001 1.5 3.6 1.0
LSC 1954 1963 2001 2.0 2.4 1.0
LSC 1954 1963 2001 2.0 3.0 2.0
LSC 1954 1963 2001 2.0 3.6 1.0
LSC 1954 1963 2001 2.0 3.9 1.0
qui gen SC_hi = SC
lab var SC_hi "SC (R=1 post-2000) high est."
LSC 1954 1963 2001 2.0 3.9 3.9

LSC 1954 1963 1999 1.5 3.0 1.0
LSC 1954 1963 2000 1.5 3.0 1.0

end

rangeSC

gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1("Proportion
 Still Alive and Smoking")saving(nqr7a,replace)
gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(JJJ)l1("Prop
ortion Still Alive and Smoking")saving(nqr7b,replace)

form LSB SC* %7.3f
form x %6.0f
keep x LSB SC_*
l, nod
save nqr7_R2_R1, replace

log close

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```


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nqr7.log

```
.
. * Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
. * Relative increase in quit rate (on or after year T1) is global variable $R1
. * Relative increase in quit rate (on or after year T2) is global variable $R2
. * Relative increase in quit rate (on or after year T3) is global variable $R3
. * (R3 can be any value, not just 1; T3 can be any value, not just 1995)
.
. * (1a) get distribution of birth year of all future claimants from age9.dta
. use age9

. keep year AllFutur

. mkmat year AllFutur

. matrix pi = year,AllFutur

. matrix drop year AllFutur

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix list pi

pi[72,2]
```

	t	pi(t)
r1	1900	.00004113
r2	1901	.00002101
r3	1902	.00003102
r4	1903	.00004538
r5	1904	.0000657
r6	1905	.00009443
r7	1906	.00013421
r8	1907	.0001888
r9	1908	.00026279
r10	1909	.00036178
r11	1910	.00049251
r12	1911	.00066282
r13	1912	.00088162
r14	1913	.00115874
r15	1914	.00150459
r16	1915	.00192976
r17	1916	.00244442
r18	1917	.00305756
r19	1918	.00377616
r20	1919	.00460425
r21	1920	.00554198
r22	1921	.00658479
r23	1922	.00772278
r24	1923	.00894043
r25	1924	.01021674
r26	1925	.01152602
r27	1926	.01283937
r28	1927	.01412696
r29	1928	.0153611
r30	1929	.01652004
r31	1930	.0175923
r32	1931	.01858097
r33	1932	.01950742
r34	1933	.02041352
r35	1934	.02136119
r36	1935	.02242851
r37	1936	.02370143
r38	1937	.02526133
r39	1938	.02716919
[illegible]	1939	[illegible]
[illegible]	1940	[illegible]
[illegible]	1941	[illegible]
[illegible]	1942	[illegible]
r44	1943	.04074331
r45	1944	.04321814
r46	1945	.04507414
r47	1946	.04608816
[illegible]	1947	.04609812
[illegible]	1948	.0450277
[illegible]	1949	.04289862
r51	1950	.03982827
r52	1951	.03601309
r53	1952	.03170149
[illegible]	1953	[illegible]
[illegible]	1954	[illegible]
r56	1955	[illegible]
r57	1956	[illegible]
r58	1957	.01117046
r59	1958	.00837034
r60	1959	.00611337
r61	1960	.00435552
r62	1961	.00303046
r63	1962	.00206233
r64	1963	.00137566
r65	1964	.00090207
r66	1965	.00058381
r67	1966	.00037486
r68	1967	.0002404
r69	1968	.00015518
r70	1969	.00010166
r71	1970	.0000681
r72	1971	.00017831

```
. drop _all

.
.
. * (1b) Compute ever-smoking prevalence by birth cohort from nir.dta
. * Note: 'nir.dta' excludes Insulator crossovers
. drop _all

. use nir

. keep coh Smok w

. tab coh [w=w], sum(Smok)
(analytic weights assumed)
```

	Summary of Smoked?			
cohort	Mean	Std. Dev.	Freq.	Obs.
-1909	.65828276	.47546956	846463	201
1910-19	.78556302	.41063019	5166357	1032
1920-29	.79826907	.40141712	11307582	1609
1930-39	.75219631	.43200298	7859782	813
1940-	.7517905	.43243825	5989541	466
Total	.77181249	.41971504	31169725	4121

```
.
. * Matrix E holds ever-smoking prevalence by cohort
```

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nqr7.log

```
. matrix E = (1880, 1909 \ 1910, 1919 \ 1920, 1929 \ 1930, 1939 \ 1940, 1971 )

. matrix E = E, J(5,1,0)

. matrix colnames E = t0 t1 Ever

.
. prog def setE
  1.    local i = 1
  2.    while `i' <= 5 {
  3.      qui sum Smok [w=w] if coh == `i'
  4.      matrix E[`i',3] = r(mean)
  5.      local i =  `i' + 1
  6.    }
  7. end

. setE

. matrix li E

E[5,3]
          t0        t1       Ever
r1      1880      1909  .65828276
r2      1910      1919  .78556302
r3      1920      1929  .79826907
r4      1930      1939  .75219631
r5      1940      1971   .7517905

.
. * (1c) Compute conditional distribn of birth year pi() among ever smokers
.
. drop _all

. svmat pi
number of observations will be reset to 72
Press any key to continue, or Break to abort
obs was 0, now 72

. ren pi1 t

. ren pi2 pi

. qui gen pi_ = .

. form pi* %9.4f

.
. prog def getpi
  1.  local i = 1
  2.  while `i' <= 5 {
  3.    replace pi_ = pi*E[`i',3] if t >= E[`i',1] & t <= E[`i',2]
  4. *    Note:  In CF with pre-1988 misconduct, ever-smoking prevalence
. *    of 1940+ birth cohort will be reduced by 3.6%. (nir4.log).
. *    But this feedback effect is very small.
.     local i = `i' + 1
  5.  }
  6.  qui sum pi_
  7.  global sumPi = r(mean)*r(N)
  8.  qui replace pi_ = pi_/$sumPi
  9. end

. getpi
(10 real changes made)
(10 real changes made)
(10 real changes made)
(10 real changes made)
(32 real changes made)

. * Replace pi_ in 3rd col of matrix pi()
. mkmat pi_

. matrix pi = pi[1..$m,1..1]

. matrix pi = pi,pi_

.
. * (2) Compute Mean Years Smoked Among Persons Who Ever Smoked
.
. drop _all

. * Get L and SB from nqr4 output
. use nqr4

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * LSB is proportion who are still smoking and alive
. gen LSB = L*SB

. qui sum LSB

. * EB is mean smoke-years taking mortality into account
. global EB = r(mean)*$N

. di "Mean smoke-years (BL) = ",%9.2f $EB
Mean smoke-years (BL) =      45.43

. * LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
. gen LSBR1 = .
(82 missing values generated)

. gen LSBR2 = .
(82 missing values generated)

. gen LSBR3 = .
(82 missing values generated)

. gen SC = .
(82 missing values generated)

.
. prog def LSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
.   global T1 = $_1
  2.    global T2 = $_2
  3.    global T3 = $_3
  4.    global R1 = $_4
  5.    global R2 = $_5
  6.    global R3 = $_6
  7. * Check T3 > T2 > T1
.   if $T2 <= $T1 | $T3 <= $T2 {
  8.      di "Invalid ",%9.0f $T1,$T2,$T3
  9.      exit
 10.    }
```

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nqr7.log

```
11. * Compute SB(x)^R1 and L(x)*SB(x)^R1
. * Compute SB(x)^R2 and L(x)*SB(x)^R2
. * Compute SB(x)^R3 and L(x)*SB(x)^R3
.   qui replace LSBR1 = L*SB^$R1
12.     qui replace LSBR2 = L*SB^$R2
13.     qui replace LSBR3 = L*SB^$R3
14.     qui replace SC = 0
15. * Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
. * SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
. * Sum over index `i' (rows of pi)
.   local i = 1
16.     while `i' <= $m {
17.       local t = pi[`i',1]
18. *     `t' year of birth
.     local u1 = $T1 - `t' - $xMin - 1
19.       local v1 = `u1' + 1
20.       local u2 = $T2 - `t' - $xMin - 1
21.       local v2 = `u2' + 1
22.       local u3 = min($T3 - `t' - $xMin - 1,$N)
23.       local v3 = `u3' + 1
24. *     Compute intermediate `areas'
.     local A1 = SB[`u1']^(1-$R1)
25.       local A2 = SB[`u2']^($R1-$R2)
26.       local A3 = SB[`u3']^($R2-$R3)
27. *     `u3' > `u2' > `u1' required
. *     Case A:
.     if `u3' <= 0 {
28.         qui replace SC = SC + pi[`i',2] * LSBR3
29.       }
30.       else {
31. *     Case B:
.       if `u3' > 0 & `u2' <= 0 {
32.           qui replace SC = SC + pi[`i',2] * LSBR2 in 1/`u3'
33.           if `v3' <= $N {
34.             qui replace SC = SC + pi[`i',2] * LSBR3 * `A3' in `v3'/$N
35.           }
36.         }
37.         else {
38. *     Case C:
.         if `u2' > 0 & `u1' <= 0 {
39.             qui replace SC = SC + pi[`i',2] * LSBR1 in 1/`u2'
40.             qui replace SC = SC + pi[`i',2] * LSBR2 * `A2' in `v2'/`u3'
41.             if `v3' <= $N {
42.               qui replace SC = SC + pi[`i',2] * LSBR3 * `A2' * `A3' in `v3'/
> $N
43.             }
44.           }
45.           else {
46. *     Case D:
.           qui replace SC = SC + pi[`i',2] * LSB in 1/`u1'
47.             qui replace SC = SC + pi[`i',2] * LSBR1 * `A1' in `v1'/`u2'
48.             qui replace SC = SC + pi[`i',2] * LSBR2 * `A1' * `A2' in `v2'/`u
> 3'
49.             if `v3' <= $N {
50.               qui replace SC = SC + pi[`i',2] * LSBR3 * `A1' * `A2' * `A3' i
> n `v3'/$N
51.             }
52.           }
53.         }
54.       }
55.       local i = `i' + 1
56.     }
57.     qui sum SC
58.     global EC = r(mean)*$N
59.     di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB
> ,%8.2f $EC,%8.2f $EB - $EC
60. end

. pro def rangeSC
1.  di "   T1    T2    T3    R1    R2    R3    XB    XC
> deltaX"
2.
.   LSC 1954 1963 2001 1.0 2.1 1.0
3.     qui gen SC_lo = SC
4.     lab var SC_lo "SC (R=1 post-2000) low est."
5.     LSC 1954 1963 2001 1.0 2.1 2.1
6.     LSC 1954 1963 2001 1.0 2.4 1.0
7.     LSC 1954 1963 2001 1.0 3.0 1.0
8.     LSC 1954 1963 2001 1.0 3.6 1.0
9.
.   LSC 1954 1963 2001 1.5 2.4 1.0
10.
.   *****Wecker change: change 1.0 and 1.5 to 1.0*****
.   *LSC 1954 1963 2001 1.5 3.0 3.0
.   LSC 1954 1963 2001 1.0 1.0 1.0
11.
.   **************End Wecker Change*************

.   qui gen SC_ = SC
12.     lab var SC_ "SC (R=1 post-2000) middle est."
13.     LSC 1954 1963 2001 1.5 3.0 3.0
14.     qui gen SC3 = SC
15.     lab var SC3 "SC (R=3 post-2000) middle est."
16.
.   LSC 1954 1963 2001 1.5 3.6 1.0
17.     LSC 1954 1963 2001 2.0 2.4 1.0
18.     LSC 1954 1963 2001 2.0 3.0 1.0
19.     LSC 1954 1963 2001 2.0 3.6 1.0
20.     LSC 1954 1963 2001 2.0 3.9 1.0
21.     qui gen SC_hi = SC
22.     lab var SC_hi "SC (R=1 post-2000) high est."
23.     LSC 1954 1963 2001 2.0 3.9 3.9
24.
.   LSC 1954 1963 1999 1.5 3.0 1.0
25.     LSC 1954 1963 2000 1.5 3.0 1.0
26.
.
. end

.
. rangeSC
```

T1	T2	T3	R1	R2	R3	XB	XC	deltaX
1954	1963	2001	1.0	2.1	1.0	45.43	37.06	8.37
1954	1963	2001	1.0	2.1	2.1	45.43	34.47	10.96
1954	1963	2001	1.0	2.4	1.0	45.43	35.34	10.09
1954	1963	2001	1.0	3.0	1.0	45.43	32.42	13.01
1954	1963	2001	1.0	3.6	1.0	45.43	30.03	15.40
1954	1963	2001	1.5	2.4	1.0	45.43	35.12	10.31
1954	1963	2001	1.0	1.0	1.0	45.43	45.43	0.00
1954	1963	2001	1.5	3.0	3.0	45.43	29.53	15.90
1954	1963	2001	1.5	3.6	1.0	45.43	29.85	15.58
1954	1963	2001	2.0	2.4	1.0	45.43	34.90	10.52
1954	1963	2001	2.0	3.0	1.0	45.43	32.03	13.40
1954	1963	2001	2.0	3.6	1.0	45.43	29.68	15.75
1954	1963	2001	2.0	3.9	1.0	45.43	28.65	16.77
1954	1963	2001	2.0	3.9	3.9	45.43	26.30	19.13
1954	1963	1999	1.5	3.0	1.0	45.43	32.75	12.68

nqr7.log

```
  1954    1963    2000      1.5      3.0      1.0    45.43    32.48    12.95

. gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1
> ("Proportion Still Alive and Smoking")saving(nqr7a,replace)
(Note: file nqr7a.gph not found)

. gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(
> JJJ)l1("Proportion Still Alive and Smoking")saving(nqr7b,replace)
(Note: file nqr7b.gph not found)

. form LSB SC* %7.3f

. form x %6.0f

. keep x LSB SC_*

. l, nod
```

	x	LSB	SC_lo	SC_	SC_hi
1.	17	1.000	1.000	1.000	1.000
2.	18	1.000	1.000	1.000	1.000
3.	19	0.999	0.998	0.999	0.996
4.	20	0.994	0.990	0.994	0.983
5.	21	0.990	0.984	0.990	0.972
6.	22	0.977	0.962	0.977	0.933
7.	23	0.973	0.956	0.973	0.922
8.	24	0.967	0.945	0.967	0.903
9.	25	0.963	0.937	0.963	0.890
10.	26	0.959	0.930	0.959	0.879
11.	27	0.954	0.922	0.954	0.865
12.	28	0.951	0.917	0.951	0.856
13.	29	0.946	0.908	0.946	0.841
14.	30	0.939	0.895	0.939	0.818
15.	31	0.934	0.886	0.934	0.803
16.	32	0.925	0.869	0.925	0.776
17.	33	0.922	0.863	0.922	0.765
18.	34	0.910	0.842	0.910	0.731
19.	35	0.900	0.823	0.900	0.701
20.	36	0.895	0.814	0.895	0.688
21.	37	0.891	0.806	0.891	0.675
22.	38	0.883	0.792	0.883	0.654
23.	39	0.873	0.773	0.873	0.625
24.	40	0.859	0.749	0.859	0.590
25.	41	0.852	0.736	0.852	0.571
26.	42	0.835	0.708	0.835	0.531
27.	43	0.822	0.685	0.822	0.500
28.	44	0.810	0.665	0.810	0.475
29.	45	0.791	0.634	0.791	0.435
30.	46	0.776	0.611	0.776	0.407
31.	47	0.760	0.587	0.760	0.379
32.	48	0.742	0.560	0.742	0.349
33.	49	0.730	0.544	0.730	0.332
34.	50	0.706	0.512	0.706	0.299
35.	51	0.695	0.499	0.695	0.287
36.	52	0.678	0.479	0.678	0.268
37.	53	0.659	0.457	0.659	0.250
38.	54	0.642	0.437	0.642	0.233
39.	55	0.618	0.413	0.618	0.214
40.	56	0.596	0.392	0.596	0.199
41.	57	0.573	0.370	0.573	0.184
42.	58	0.559	0.357	0.559	0.175
43.	59	0.536	0.338	0.536	0.163
44.	60	0.510	0.317	0.510	0.151
45.	61	0.492	0.303	0.492	0.143
46.	62	0.473	0.288	0.473	0.135
47.	63	[illegible]	[illegible]	0.448	[illegible]
48.	64	[illegible]	[illegible]	[illegible]	[illegible]
49.	65	[illegible]	[illegible]	0.411	[illegible]
50.	66	[illegible]	[illegible]	[illegible]	0.105
51.	67	0.374	[illegible]	0.374	0.100
52.	68	0.355	0.207	0.355	0.095
53.	69	0.335	0.194	0.335	0.089
54.	70	0.316	0.182	0.316	0.083
55.	71	0.299	0.172	0.299	0.078
56.	72	0.285	0.163	0.285	0.075
57.	73	0.273	0.156	0.273	0.071
58.	74	0.260	0.149	0.260	0.068
59.	75	0.250	0.143	0.250	0.065
60.	76	0.236	0.134	0.236	0.061
61.	77	0.222	0.127	0.222	0.058
62.	78	[illegible]	0.121	0.213	0.055
63.	79	0.203	0.116	0.203	0.053
64.	80	[illegible]	0.109	0.191	0.050
65.	81	0.176	0.100	0.176	0.046
66.	82	0.167	0.095	0.167	0.043
67.	83	0.161	0.092	0.161	0.042
68.	84	0.159	0.091	0.159	0.042
69.	85	0.158	0.090	0.158	0.041
70.	86	0.157	0.089	0.157	0.041
71.	87	0.149	0.085	0.149	0.039
72.	88	0.141	0.081	0.141	0.037
73.	89	0.127	0.072	0.127	0.033
74.	90	0.126	0.072	0.126	0.033
75.	91	0.126	0.072	0.126	0.033
76.	92	0.126	0.072	0.126	0.033
77.	93	0.126	0.072	0.126	0.033
78.	94	0.117	0.067	0.117	0.030
79.	95	0.117	0.067	0.117	0.030
80.	96	0.117	0.067	0.117	0.030
81.	97	0.117	0.067	0.117	0.030
82.	98	0.117	0.067	0.117	0.030

```
. save nqr7_R2_R1, replace
(Note: file nqr7_R2_R1.dta not found)
file nqr7_R2_R1.dta saved

.

. log close
```

nqr8_R2_R1.do

```
* @RM500
* nqr8: BL-CF differences in mean smoke-years exposure
* based upon empirical smoke-survival curve and mortality
* of claimants in HRA audit files
* Relative risk quitting model hC(t) = R1*hB(t) if T2 > year >= T1
* hC(t) = R2*hB(t) if T3 > year >= T2, where T2 > T1
* hC(t) = R3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* Scenario     pre-88 misconduct     Estimate      R1      R2      R3
*    BL              -                  -         1.0     1.0     1.0
*    CF             yes                low        1.0     2.1     1.0
*    CF             yes                mid        1.5     3.0     1.0
*    CF             yes                high       2.0     3.9     1.0

* Input files: nqr, nqr4
clear
prog drop _all
set matsize 800
set rmsg off
set more off

log using nqr8, replace

* Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
* Relative increase in quit rate (on or after year T1) is global variable $R1
* Relative increase in quit rate (on or after year T2) is global variable $R2
* Relative increase in quit rate (on or after year T3) is global variable $R3
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)

* (1) Conditional distribn of birth year pi() among 'past' ever smokers

use nqr
* Save distribution of yrborn in Matrix pi(t)
qui tab yrborn [w=w], matcell(pi) matrow(t_)
matrix pi = pi/_result(1)
matrix pi = t_, pi
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix drop t_
*matrix list pi

* (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

drop _all
* Get L and SB from nqr4 output
use nqr4
qui sum x
global xMin = r(min)
global N = _N

* LSB is proportion who are still smoking and alive
gen LSB = L*SB
qui sum LSB
* EB is mean smoke-years taking mortality into account
global EB = r(mean)*$N
di "Mean smoke-years (BL) = ",%9.2f $EB
* LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
gen LSBR1 = .
gen LSBR2 = .
gen LSBR3 = .
gen SC = .

prog def LSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global R1 = $_4
  global R2 = $_5
  global R3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
  }
* Compute SB(x)^R1 and L(x)*SB(x)^R1
* Compute SB(x)^R2 and L(x)*SB(x)^R2
* Compute SB(x)^R3 and L(x)*SB(x)^R3
  qui replace LSBR1 = L*SB^$R1
  qui replace LSBR2 = L*SB^$R2
  qui replace LSBR3 = L*SB^$R3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min{x,T1-t})^(1-R1)*
* SB(min{x,T2-t})^(R1-R2)*SB(min{x,T3-t})^(R2-R3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
*   't' year of birth
    local u1 = $T1 - 't' - $xMin - 1
    local v1 = 'u1' + 1
    local u2 = $T2 - 't' - $xMin - 1
    local v2 = 'u2' + 1
    local u3 = min($T3 - 't' - $xMin - 1,$N)
    local v3 = 'u3' + 1
*   Compute intermediate 'areas'
    local A1 = SB['u1']^(1-$R1)
    local A2 = SB['u2']^($R1-$R2)
    local A3 = SB['u3']^($R2-$R3)
*   'u3' > 'u2' > 'u1' required
*   Case A:
    if 'u3' <= 0 {
      qui replace SC = SC + pi['i',2] * LSBR3
    }
    else {
*   Case B:
      if 'u3' > 0 & 'u2' <= 0 {
        qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
        if 'v3' <= $N {
          qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
        }
      }
      else {
*   Case C:
        if 'u2' > 0 & 'u1' <= 0 {
          qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
          qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
          if 'v3' <= $N {
            qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/$N
          }
        }
        else {
*   Case D:
          qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
          qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
          qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u3'
```

nqr8_R2_R1.do

```
        if `v3' <= $N {
          qui replace SC = SC + pi(`i',2) * LSBR3 * `A1' * `A2' * `A3' in `v3'/$N
        }
      }
    }
  }
  local i = `i' + 1
 }
 qui sum SC
 global EC = r(mean)*$N
 di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB,%8.2f $EC,%8.
2f $EB - $EC
end

prog def rangeSC
 di "      T1       T2       T3       R1       R2       R3       XB       XC    deltaX"

 LSC 1954 1963 2001 1.0 2.1 1.0
 qui gen SC_lo = SC
 lab var SC_lo "SC (R=1 post-2000) low est."
 LSC 1954 1963 2001 1.0 2.1 2.1
 LSC 1954 1963 2001 1.0 2.4 1.0
 LSC 1954 1963 2001 1.0 3.0 1.0
 LSC 1954 1963 2001 1.0 3.6 1.0

 LSC 1954 1963 2001 1.5 2.4 1.0

******Wecker Change: change 3.0 and 1.5 to 1.0******

*LSC 1954 1963 2001 1.5 3.0 1.0
 LSC 1954 1963 2001 1.0 1.0 1.0

*************End Wecker Change************

 qui gen SC_ = SC
 lab var SC_ "SC (R=1 post-2000) middle est."
 LSC 1954 1963 2001 1.5 3.0 3.0
 qui gen SC3 = SC
 lab var SC3 "SC (R=3 post-2000) middle est."

 LSC 1954 1963 2001 1.5 3.6 1.0
 LSC 1954 1963 2001 2.0 2.4 1.0
 LSC 1954 1963 2001 2.0 3.0 1.0
 LSC 1954 1963 2001 2.0 3.6 1.0
 LSC 1954 1963 2001 2.0 3.9 1.0
 qui gen SC_hi = SC
 lab var SC_hi "SC (R=1 post-2000) high est."
 LSC 1954 1963 2001 2.0 3.9 3.9

 LSC 1954 1963 1999 1.5 3.0 1.0
 LSC 1954 1963 2000 1.5 3.0 1.0

end

rangeSC

gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1("Proportio
n Still Alive and Smoking")saving(nqr8a,replace)
gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(JJJ)l1("Pro
portion Still Alive and Smoking")saving(nqr8b,replace)

form LSB SC* %7.3f
form x %6.0f

keep x LSB SC_*
l, nod
save nqr8_R2_R1, replace

log close
\032
```


52614 0853

nqr8.log

```
. * Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
. * Relative increase in quit rate (on or after year T1) is global variable $R1
. * Relative increase in quit rate (on or after year T2) is global variable $R2
. * Relative increase in quit rate (on or after year T3) is global variable $R3
. * (R3 can be any value, not just 1; T3 can be any value, not just 1999)

. * (1) Conditional distribn of birth year pi() among "past" ever smokers

. use nqr

. * Save distribution of yrborn in Matrix pi(t)
. qui tab yrborn [w=w], matcell(pi) matrow(t_)

. matrix pi = pi _result(1)

. matrix pi = t_, pi

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix drop t_

. *matrix list pi

. * (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

. drop _all

. * Get L and SB from nqr4 output
. use nqr4

. qui sum x

. global xMin = r(min)

. global N = _N

. * LSB is proportion who are still smoking and alive
. gen LSB = L*SB

. qui sum LSB

. * EB is mean smoke-years taking mortality into account
. global EB = r(mean)*$N

. di "Mean smoke-years (BL) = ",%9.2f $EB
Mean smoke-years (BL) =       45.43

. * LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
. gen LSBR1 = .
(82 missing values generated)

. gen LSBR2 = .
(82 missing values generated)

. gen LSBR3 = .
(82 missing values generated)

. gen SC = .
(82 missing values generated)

. prog def LSC
 1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
. global T1 = $_1
 2.   global T2 = $_2
 3.   global T3 = $_3
 4.   global R1 = $_4
 5.   global R2 = $_5
 6.   global R3 = $_6
 7. * Check T3 > T2 > T1
. if $T2 <= $T1 | $T3 <= $T2 {
 8.     di "Invalid ",%9.0f $T1,$T2,$T3
 9.     exit
10.     }
11. * Compute SB(x)^R1 and L(x)*SB(x)^R1
. * Compute SB(x)^R2 and L(x)*SB(x)^R2
. * Compute SB(x)^R3 and L(x)*SB(x)^R3
. qui replace LSBR1 = L*SB^$R1
12.   qui replace LSBR2 = L*SB^$R2
13.   qui replace LSBR3 = L*SB^$R3
14.   qui replace SC = 0
15. * Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
. * SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
. * Sum over index 'i' (rows of pi)
. local i = 1
16.   while 'i' <= $m {
17.     local t = pi['i',1]
18. *   't' year of birth
.     local u1 = $T1 - 't' - $xMin - 1
19.     local v1 = 'u1' + 1
20.     local u2 = $T2 - 't' - $xMin - 1
21.     local v2 = 'u2' + 1
22.     local u3 = min($T3 - 't' - $xMin - 1,$N)
23.     local v3 = 'u3' + 1
24. *   Compute intermediate 'areas'
.     local A1 = SB['u1']^(1-$R1)
25.     local A2 = SB['u2']^($R1-$R2)
26.     local A3 = SB['u3']^($R2-$R3)
27. *   'u3' > 'u2' > 'u1' required
. *   Case A:
.     if 'u3' <= 0 {
28.       qui replace SC = SC + pi['i',2] * LSBR3
29.     }
30.     else {
31. *     Case B:
.       if 'u3' > 0 & 'u2' <= 0 {
32.         qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
33.         if 'v3' <= $N {
34.           qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
35.         }
36.       }
37.       else {
38. *       Case C:
.         if 'u2' > 0 & 'u1' <= 0 {
39.           qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
40.           qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
41.           if 'v3' <= $N {
42.             qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/
> $N
43.           }
44.         }
45.         else {
```


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```
46. *    Case D:
          qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
47.         qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
48.         qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/...
> 3'
49.         if 'v3' <= SN {
50.           qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' i
> n 'v3'/SN
51.           }
52.         }
53.       }
54.     }
55.     local i = 'i' + 1
56.   }
57.   qui sum SC
58.   global EC = r(mean)*SN
59.   di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB
> ,%8.2f $EC,%8.2f $EB - $EC
60. end

. prog def rangeSC
  1.   di "     T1       T2       T3       R1       R2       R3       XB       XC
>     deltaX"
  2.
.   LSC 1954 1963 2001 1.0 2.1 1.0
  3.   qui gen SC_lo = SC
  4.   lab var SC_lo "SC (R=1 post-2000) low est."
  5.   LSC 1954 1963 2001 1.0 2.1 2.1
  6.   LSC 1954 1963 2001 1.0 2.4 1.0
  7.   LSC 1954 1963 2001 1.0 3.0 1.0
  8.   LSC 1954 1963 2001 1.0 3.6 1.0
  9.
.   LSC 1954 1963 2001 1.5 2.4 1.0
 10.
.   ******Wecker Change: change 3.0 and 1.5 to 1.0******
.   *LSC 1954 1963 2001 1.5 3.0 1.0
.   LSC 1954 1963 2001 1.0 1.0 1.0
 11.
.   **************End Wecker Change************
.   qui gen SC_ = SC
 12.   lab var SC_ "SC (R=1 post-2000) middle est."
 13.   LSC 1954 1963 2001 1.5 3.0 3.0
 14.   qui gen SC3 = SC
 15.   lab var SC3 "SC (R=3 post-2000) middle est."
 16.
.   LSC 1954 1963 2001 1.5 3.6 1.0
 17.   LSC 1954 1963 2001 2.0 2.4 1.0
 18.   LSC 1954 1963 2001 2.0 3.0 1.0
 19.   LSC 1954 1963 2001 2.0 3.6 1.0
 20.   LSC 1954 1963 2001 2.0 3.9 1.0
 21.   qui gen SC_hi = SC
 22.   lab var SC_hi "SC (R=1 post-2000) high est."
 23.   LSC 1954 1963 2001 2.0 3.9 3.9
 24.
.   LSC 1954 1963 1999 1.5 3.0 1.0
 25.   LSC 1954 1963 2000 1.5 3.0 1.0
 26.
. end
```

general

asbestos specific

remove asbestos specific
and general
quit rate effects
(past)

. rangeSC

T1	T2	T3	R1	R2	R3	XB	XC	deltaX
1954	1963	2001	1.0	2.1	1.0	45.43	37.02	8.41
1954	1963	2001	1.0	2.1	2.1	45.43	36.18	9.25
1954	1963	2001	1.0	2.4	1.0	45.43	35.49	9.94
1954	1963	2001	1.0	3.0	1.0	45.43	33.02	12.41
1954	1963	2001	1.0	3.6	1.0	45.43	31.13	14.30
1954	1963	2001	1.5	2.4	1.0	45.43	34.94	10.49
1954	1963	2001	1.0	1.0	1.0	45.43	45.43	0.00
1954	1963	2001	1.5	3.0	3.0	45.43	31.75	13.67
1954	1963	2001	1.5	3.6	1.0	45.43	30.69	14.74
1954	1963	2001	2.0	2.4	1.0	45.43	34.42	11.01
1954	1963	2001	2.0	3.0	1.0	45.43	32.07	13.36
1954	1963	2001	2.0	3.6	1.0	45.43	30.27	15.16
1954	1963	2001	2.0	3.9	1.0	45.43	29.52	15.91
1954	1963	2001	2.0	3.9	3.9	45.43	28.91	16.51
1954	1963	1999	1.5	3.0	1.0	45.43	32.75	12.68
1954	1963	2000	1.5	3.0	1.0	45.43	32.64	12.79

```
. gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1
> ("Proportion Still Alive and Smoking")saving(nqr8a,replace)
(Note: file nqr8a.gph not found)

. gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(
> JJJ)l1("Proportion Still Alive and Smoking")saving(nqr8b,replace)
(Note: file nqr8b.gph not found)

. form LSB SC* %7.3f

. form x %6.0f

. keep x LSB SC_*

. l, nod
```

	x	LSB	SC_lo	SC_	SC_hi
1.	17	1.000	1.000	1.000	1.000
2.	18	1.000	1.000	1.000	1.000
3.	19	0.999	0.998	0.999	0.998
4.	20	0.994	0.993	0.994	0.990
5.	21	0.990	0.988	0.990	0.984
6.	22	0.977	0.973	0.977	0.961
7.	23	0.973	0.968	0.973	0.955
8.	24	0.967	0.960	0.967	0.943
9.	25	0.963	0.955	0.963	0.935
10.	26	0.959	0.950	0.959	0.927
11.	27	0.954	0.944	0.954	0.918
12.	28	0.951	0.940	0.951	0.912
13.	29	0.946	0.933	0.946	0.901
14.	30	0.939	0.923	0.939	0.885
15.	31	0.934	0.916	0.934	0.873
16.	32	0.925	0.903	0.925	0.852
17.	33	0.922	0.898	0.922	0.844
18.	34	0.910	0.881	0.910	0.816
19.	35	0.900	0.865	0.900	0.790
20.	36	0.895	0.858	0.895	0.778
21.	37	0.891	0.851	0.891	0.767
22.	38	0.883	0.838	0.883	0.747
23.	39	0.873	0.821	0.873	0.718
24.	40	0.859	0.798	0.859	0.683
25.	41	0.852	0.786	0.852	0.664
26.	42	0.835	0.758	0.835	0.622
27.	43	0.822	0.735	0.822	0.588

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28.	44	0.810	0.715	0.810	0.559
29.	45	0.791	0.682	0.791	0.513
30.	46	0.776	0.657	0.776	0.480
31.	47	0.760	0.631	0.760	[illegible]
32.	48	0.742	0.601	0.742	[illegible]
33.	49	0.730	0.582	0.730	[illegible]
34.	50	0.706	0.545	0.706	0.341
35.	51	0.695	0.529	0.695	0.323
36.	52	0.678	0.505	0.678	0.297
37.	53	0.659	0.478	0.659	0.270
38.	54	0.642	0.453	0.642	0.245
39.	55	0.618	0.422	0.618	0.216
40.	56	0.596	0.394	0.596	0.192
41.	57	0.573	0.366	0.573	0.168
42.	58	0.559	0.349	0.559	0.155
43.	59	0.536	0.324	0.536	0.137
44.	60	0.510	0.297	0.510	0.118
45.	61	0.492	0.279	0.492	0.107
46.	62	0.473	0.261	0.473	0.096
47.	63	0.448	0.238	0.448	0.083
48.	64	0.428	0.221	0.428	0.074
49.	65	0.411	0.207	0.411	0.067
50.	66	0.390	0.191	0.390	0.060
51.	67	0.374	0.179	0.374	0.055
52.	68	0.355	0.166	0.355	0.049
53.	69	0.335	0.152	0.335	0.044
54.	70	0.316	0.141	0.316	0.040
55.	71	0.299	0.130	0.299	0.036
56.	72	0.285	0.122	0.285	0.034
57.	73	0.273	0.116	0.273	0.032
58.	74	0.260	0.109	0.260	0.030
59.	75	0.250	0.104	0.250	0.028
60.	76	0.236	0.097	0.236	0.026
61.	77	0.222	0.091	0.222	0.024
62.	78	0.213	0.087	0.213	0.023
63.	79	0.203	0.083	0.203	0.022
64.	80	0.191	0.078	0.191	0.021
65.	81	0.176	0.071	0.176	0.019
66.	82	0.167	0.068	0.167	0.018
67.	83	0.161	0.065	0.161	0.017
68.	84	0.159	0.065	0.159	0.017
69.	85	0.158	0.064	0.158	0.017
70.	86	0.157	0.063	0.157	0.017
71.	87	0.149	0.060	0.149	0.016
72.	88	0.141	0.057	0.141	0.015
73.	89	0.127	0.051	0.127	0.014
74.	90	0.126	0.051	0.126	0.014
75.	91	0.126	0.051	0.126	0.014
76.	92	0.126	0.051	0.126	0.014
77.	93	0.126	0.051	0.126	0.014
78.	94	0.117	0.047	0.117	0.013
79.	95	0.117	0.047	0.117	0.013
80.	96	0.117	0.047	0.117	0.013
81.	97	0.117	0.047	0.117	0.013
82.	98	0.117	0.047	0.117	0.013

```
. save nqr8_R2_R1, replace
(Note: file nqr8_R2_R1.dta not found)
file nqr8_R2_R1.dta saved

.
.
. log close
```

ndx4_R2_r2_R1.do

```
* @RM500
* ndx4:  Combines output of nqr8 (quit-rate effect) and nir6 (initiation-rate) effect
* to estimate delta X (change in mean lifetime years of smoking) for past claimants
* Produces low, med, and high estimates for CF scenario without post-2000 misconduct

clear
prog drop _all
set matsize 500
set rmsg off
set more off

log using ndx4, replace
* Future claimants: Effects of decreased initiation
use nir6_r2
* Compute frequency distributions
prog def Freq
 qui gen f$_1 = F$_1 - F$_1[_n-1]
end

Freq B
Freq C_lo
Freq C_
Freq C_hi
drop F*
drop in 1
form f* %7.3f
form x %6.0f

* Combine with results on Past Claimants: Effect of Increase Quit Rates
merge x using nqr8_R2_R1
ren LSB SB
* Reverse sort order to compute conditional means
gen byte n = _N - _n
sort n
drop n

* Compute conditional means
prog def CondMean
 qui replace S$_1 = S$_1[_n-1] if S$_1 == .
 qui gen m$_1 = sum(S$_1)
 qui replace m$_1 = m$_1/S$_1
end

CondMean B
CondMean C_lo
CondMean C_
CondMean C_hi
keep x f* m*
form m* %7.3f
sort x
drop if fB == .

* Compute Mean Years Smoked (X)
prog def mX
 qui gen s$_1 = f$_1 * m$_1
 qui sum s$_1
 global X$_1 = r(mean)*r(N)
 drop s$_1
end

mX B
mX C_lo
mX C_
mX C_hi

* Baseline scenario: Mean Years Smoked
di %9.1f $XB
prog def Results
 di "---      Decrease in mean years smoked      ---"
 di "Post-2000         Low         Middle         High"
 di "Misconduct        Est.        Est.           Est."
 di "  No      ",%12.1f $XB - $XC_lo,%12.1f $XB - $XC_,%12.1f $XB - $XC_hi
end
Results

* Convert results to matrix & save
*matrix def dX = J(2,3,0)
matrix def dX = J(1,3,0)
matrix dX[1,1] = $XB - $XC_lo
matrix dX[1,2] = $XB - $XC_
matrix dX[1,3] = $XB - $XC_hi
drop _all
svmat dX
gen byte Scenario = _n
lab def Scenario 1"No Post2000" 2"Post2000"
lab val Scenario Scenario
ren dX1 dX_lo
ren dX2 dX
ren dX3 dX_hi
gen byte Era = 1
lab def Era 1"Past" 2"Future"
lab val Era Era
order Era Scenario dX_lo dX dX_hi
form dX* %9.2f
save ndx4_R2_r2_R1, replace
1
log close

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```


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ndx4.log

```
. * Future claimants: Effects of decreased initiation
. use nir6_r2

. * Compute frequency distributions
. prog def Freq
  1.   qui gen f$_1 = F$_1 - F$_1[_n-1]
  2. end

. Freq B

. Freq C_lo

. Freq C_

. Freq C_hi

. drop F*

. drop in 1
(1 observation deleted)

. form f* %7.3f

. form x %6.0f

. * Combine with results on Past Claimants: Effect of Increase Quit Rates
. merge x using ngrR_R2_R1

. ren LSB SB

. * Reverse sort order to compute conditional means
. gen byte n = _N - _n

. sort n

. drop n

. * Compute conditional means
. prog def CondMean
  1.   qui replace S$_1 = S$_1[_n-1] if S$_1 == .
  2.   qui gen m$_1 = sum(S$_1)
  3.   qui replace m$_1 = m$_1/S$_1
  4. end

. CondMean B

. CondMean C_lo

. CondMean C_

. CondMean C_hi

. keep x f* m*

. form m* %7.3f

. sort x

. drop if fB == .
(48 observations deleted)
```

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```
. * Compute Mean Years Smoked (X)
. prog def mX
  1.   qui gen s$_1 = f$_1 * m$_1
  2.   qui sum s$_1
  3.   global X$_1 = r(mean) * r(N)
  4.   drop s$_1
  5. end

. mX B

. mX C_lo

. mX C_

. mX C_hi

. * Baseline scenario: Mean Years Smoked
. di %9.1f $XB
     32.2

. prog def Results
  1.   di "---        Decrease in mean years smoked      ---"
  2.   di "Post-2000           Low          Middle          High"
  3.   di "Misconduct          Est.          Est.            Est."
  4.   di " No     ",%12.1f $XB - $XC_lo,%12.1f $XB - $XC_,%12.1f $XB - $XC_hi
  5. end

. Results
---          Decrease in mean years smoked       ---
Post-2000          Low          Middle          High
Misconduct         Est.          Est.           Est.
 No                6.9           0.3            13.3

.
. 
. * Convert results to matrix & save
. * matrix def dX = J(2,3,0)
. matrix def dX = J(1,3,0)

. matrix dX[1,1] = $XB - $XC_lo

. matrix dX[1,2] = $XB - $XC_

. matrix dX[1,3] = $XB - $XC_hi

. drop _all

. svmat dX
number of observations will be reset to 1
Press any key to continue, or Break to abort
obs was 0, now 1

. gen byte Scenario = _n

. lab def Scenario 1"No-Post2000" 2"Post2000"

. lab val Scenario Scenario

. ren dX1 dX_lo

. ren dX2 dX
```

ndx4.log

```
. ren dX3 dX_hi

. gen byte Era = 1

. lab def Era 1"Past" 2"Future"

. lab val Era Era

. order Era Scenario dX_lo dX dX_hi

. form dX* %9.2f

. save ndx4_R2_r2_R1, replace
(Note: file ndx4_R2_r2_R1.dta not found)
file ndx4_R2_r2_R1.dta saved

. l

       Era    Scenario     dX_lo       dX     dX_hi
  1.   Past   No-Post2000   6.86      0.35    13.2?

. log close
```

c.f. Harris's reduction in mean smoking of 10.65

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Ms8a_R2_r2_R1.lim


```
/* LIMDEP 7.0 source code:
   Multivariate normal analysis of:
     1. cumulative incidence of Lung Cancer (diedLC);
     2. prevalence of parenchymal disease by ILO profusion
        score on X-ray) (Par);
     3. abnormal pulmonary function by spirometric
        determination of FVC) (PFT); and
     4. Pleural injury (anyPleu)
   This 'main' version assumes that there no relationship between
   smoking and pleural injury.
   Exposure results based upon assumption of no misconduct post-2000.
 */

/* Restrict analysis to main sample (2,243) rather than
   extended sample (2,609) */
reject; new; w = 0 $
skip

/* RHS variables (including years smoked, age categories, and
   categories of post-latency asbestos exposure as 'X' */
namelist; X = one, smokYrs, ageG*, T10_* $

/* Separate namelist with years smoked dropped for pleural disease
   dose-response models only */
namelist; Xo = one, ageG*, T10_* $

/* Descriptive statistics (sample means) of RHS variables */
dstat; rhs = X $

/* Save sample mean values of X's (and constant) in X_BL,
   which corresponds to baseline scenario (BL) */
matrix; Xmeans = part(LastDsta, 1, 7, 1, 1) $
/* Append 1 to vector of sample means */
matrix; u = [1] $
matrix; X_BL = [u / Xmeans] $

/* Construct conformal vector for Xo_BL */
dstat; rhs = Xo $
matrix; Xomeans = part(LastDsta, 1, 6, 1, 1) $
matrix; Xo_BL = [u / Xomeans] $

/* Univariate models: Show marginal effects.
   Note: LIMDEP computes partial derivatives dF/dXi, while
   Stata by default shows discrete effects deltaF/deltaXi. */

probit; lhs = diedLC; rhs = X; marginal effects $
matrix; b_LC = B $

probit; lhs = Par; rhs = X; marginal effects $
matrix; b_Par = B $

probit; lhs = PFT; rhs = X; marginal effects $
matrix; b_PFT = B $

/* Note change in RHS for anyPleu */
probit; lhs = anyPleu; rhs = Xo; marginal effects $
matrix; b_Ple = B $

/* Pairwise Bivariate probit models */

bivariate; lhs = diedLC, Par; rh1 = X; rh2 = X;
        start = b_LC, b_Par; marginal effects $
matrix; b_LC = part(B, 1, 8) $
calc; rhoLCPar = rho $

bivariate; lhs = Par, PFT; rh1 = X; rh2 = X;
        start = b_Par, b_PFT; marginal effects $
matrix; b_Par = part(B, 1, 8); b_PFT = part(B, 9, 16) $
calc; rhoParPF = rho $

bivariate; lhs = diedLC, PFT; rh1 = X; rh2 = X;
        start = b_LC, b_PFT; marginal effects $
calc; rhoLCPFT = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = diedLC, anyPleu; rh1 = X; rh2 = Xo;
        start = b_LC, b_Ple; marginal effects $
calc; rhoLCPle = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = Par, anyPleu; rh1 = X; rh2 = Xo;
        start = b_Par, b_Ple; marginal effects $
/* Note change in dimension of b_Ple */
matrix; b_Ple = part(B, 9, 15) $
calc; rhoParPl = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = PFT, anyPleu; rh1 = X; rh2 = Xo;
        start = b_PFT, b_Ple; marginal effects $
calc; rhoPFTPl = rho $


/* 4x4 Variance-covariance matrix for multivariate
   normal calculations */
matrix; Omega4 = [1 /
                  rhoLCPar, 1/
                  rhoLCPFT, rhoParPF, 1/
                  rhoLCPle, rhoParPl, rhoPFTPl, 1] $

/* 3x3 Variance-covariance submatrix for multivariate
   normal calculations */
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $

/* Computation of indices XB at (baseline) means of X
   from probit models */
matrix; y_LC = X_BL'b_LC $
matrix; y_Par = X_BL'b_Par $
matrix; y_PFT = X_BL'b_PFT $
/* Note change in code for pleural */
matrix; y_Ple = Xo_BL'b_Ple $

/* Counterfactual values of indices (past) - no post-2000 misconduct */
matrix; y_LC_p   = y_LC - 0.35*Part(b_LC,2,2,1,1) $
matrix; y_LC_pHi = y_LC - 0.35*Part(b_LC,2,2,1,1) $
matrix; y_LC_pLo = y_LC - 0.35*Part(B_LC,2,2,1,1) $

matrix; y_Pa_p   = y_Par - 0.35*Part(b_Par,2,2,1,1) $
matrix; y_Pa_pHi = y_Par - 0.35*Part(b_Par,2,2,1,1) $
matrix; y_Pa_pLo = y_Par - 0.35*Part(b_Par,2,2,1,1) $

matrix; y_PF_p   = y_PFT - 0.35*Part(b_PFT,2,2,1,1) $
matrix; y_PF_pHi = y_PFT - 0.35*Part(b_PFT,2,2,1,1) $
matrix; y_PF_pLo = y_PFT - 0.35*Part(b_PFT,2,2,1,1) $

/* Note change in code for pleural disease */
matrix; y_Pl_p   = y_Ple $
matrix; y_Pl_pHi = y_Ple $
matrix; y_Pl_pLo = y_Ple $

/* Counterfactual values of indices (future) - no post-2000 misconduct */
```

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```
matrix; y_LC_f   = y_LC - 12.08*Part(b_LC,2,2,1,1) $
matrix; y_LC_fHi = y_LC - 12.08*Part(b_LC,2,2,1,1) $
matrix; y_LC_fLo = y_LC - 12.08*Part(b_LC,2,2,1,1) $

matrix; y_Pa_f   = y_Par - 12.08*Part(b_Par,2,2,1,1) $
matrix; y_Pa_fHi = y_Par - 12.08*Part(b_Par,2,2,1,1) $
matrix; y_Pa_fLo = y_Par -12.08*Part(b_Par,2,2,1,1) $

matrix; y_PF_f   = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $
matrix; y_PF_fHi = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $
matrix; y_PF_fLo = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $

/* Note change in code for pleural disease */
matrix; y_Pl_f   = y_Ple  $
matrix; y_Pl_fHi = y_Ple  $
matrix; y_Pl_fLo = y_Ple  $

/* Probability of still getting LC (p11) */
calc; p_LC = phi(y_LC) $
calc; p11_p = phi(y_LC_p)/p_LC $
calc; p11_pLo = phi(y_LC_pLo)/p_LC $
calc; p11_pHi = phi(y_LC_pHi)/p_LC $
calc; p11_f = phi(y_LC_f)/p_LC $
calc; p11_fLo = phi(y_LC_fLo)/p_LC $
calc; p11_fHi = phi(y_LC_fHi)/p_LC $

/* Probability of not getting LC but instead getting
   Disabling BID (Par and PFT) (p21); as well as
   Probability of not getting LC but instead getting
   Non-disabling BID (Par and not PFT) (p31) */

/* Use Greene's sign convention matrix (page 229)*/
matrix; T = [1,0,0/0,1,0/0,0,-1] $
matrix; Omega3A = T*Omega3*T $

matrix; z0 = [y_LC   / y_Pa_p / y_PF_p ] $
matrix; z1 = [y_LC_p / y_Pa_p / y_PF_p ] $
calc; p21_p = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_pLo / y_PF_pLo ] $
matrix; z1 = [y_LC_pLo / y_Pa_pLo / y_PF_pLo ] $
calc; p21_pLo = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_pHi / y_PF_pHi ] $
matrix; z1 = [y_LC_pHi / y_Pa_pHi / y_PF_pHi ] $
calc; p21_pHi = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_f / y_PF_f ] $
matrix; z1 = [y_LC_f / y_Pa_f / y_PF_f ] $
calc; p21_f = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_fLo / y_PF_fLo ] $
matrix; z1 = [y_LC_fLo / y_Pa_fLo / y_PF_fLo ] $
calc; p21_fLo = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_fHi / y_PF_fHi ] $
matrix; z1 = [y_LC_fHi / y_Pa_fHi / y_PF_fHi ] $
calc; p21_fHi = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

/* Collect results in subdiagonal matrices and clean up.*/
matrix; P_p = Iden(4) $
matrix; P_pLo = Iden(4) $
matrix; P_pHi = Iden(4) $
matrix; P_f = Iden(4) $
matrix; P_fLo = Iden(4) $
matrix; P_fHi = Iden(4) $

matrix; P_p(1,1) = p11_p $
matrix; P_p(2,1) = p21_p $
matrix; P_p(3,1) = p31_p $
calc; delete p11_p, p21_p, p31_p $

matrix; P_pLo(1,1) = p11_pLo $
matrix; P_pLo(2,1) = p21_pLo $
matrix; P_pLo(3,1) = p31_pLo $
calc; delete p11_pLo, p21_pLo, p31_pLo $

matrix; P_pHi(1,1) = p11_pHi $
matrix; P_pHi(2,1) = p21_pHi $
matrix; P_pHi(3,1) = p31_pHi $
calc; delete p11_pHi, p21_pHi, p31_pHi $

matrix; P_f(1,1) = p11_f $
matrix; P_f(2,1) = p21_f $
matrix; P_f(3,1) = p31_f $
calc; delete p11_f, p21_f, p31_f $

matrix; P_fLo(1,1) = p11_fLo $
matrix; P_fLo(2,1) = p21_fLo $
matrix; P_fLo(3,1) = p31_fLo $
calc; delete p11_fLo, p21_fLo, p31_fLo $

matrix; P_fHi(1,1) = p11_fHi $
matrix; P_fHi(2,1) = p21_fHi $
matrix; P_fHi(3,1) = p31_fHi $
calc; delete p11_fHi, p21_fHi, p31_fHi $


/* Probability of not getting LC but instead getting
   Pleural disease only (p41) */
/* Construct new 3x3 submatrix of Omega4 that gives only
   correlations of LC, Par, and Pl */

matrix; Omega3 = [1 /
                  rhoLCPar, 1/
                  rhoLCPle, rhoParPl, 1] $

/* As before, use Greene's sign convention matrix (page 229)*/
matrix; T = [1,0,0/0,-1,0/0,0,1] $
matrix; Omega3A = T*Omega3*T $
```

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```
matrix; z0 = [y_LC   / y_Pa_p / y_Pl_p] $
matrix; z1 = [y_LC_p / y_Pa_p / y_Pl_p] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pLo / y_Pl_pLo] $
matrix; z1 = [y_LC_pLo / y_Pa_pLo / y_Pl_pLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pHi / y_Pl_pHi] $
matrix; z1 = [y_LC_pHi / y_Pa_pHi / y_Pl_pHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_f / y_Pl_f] $
matrix; z1 = [y_LC_f / y_Pa_f / y_Pl_f] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fLo / y_Pl_fLo] $
matrix; z1 = [y_LC_fLo / y_Pa_fLo / y_Pl_fLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fHi / y_Pl_fHi] $
matrix; z1 = [y_LC_fHi / y_Pa_fHi / y_Pl_fHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

/* Collect results and clean up. */
matrix; P_p(4,1) = p41_p $
matrix; P_pLo(4,1) = p41_pLo $
matrix; P_pHi(4,1) = p41_pHi $
matrix; P_f(4,1) = p41_f $
matrix; P_fLo(4,1) = p41_fLo $
matrix; P_fHi(4,1) = p41_fHi $
calc; delete p41_p, p41_pLo, p41_pHi $
calc; delete p41_f, p41_fLo, p41_fHi $

/* Probability of Not Getting DBID but getting Non-Disabling
   BID in CF (no LC, Par but No PTF) */
/* Use original omega3 submatrix */
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $
/* Sign matrix on order restrictions */
matrix; T = [-1,0,0/0,1,0/0,0,1] $
matrix; Omega3A = T*Omega3*T $
matrix; z = [y_LC  / y_Par / y_PFT ] $
matrix; zA = T*z $
/* Probability of DBID and not LC in BL */
calc; p_DBID = Mvn(zA, Omega3A) $

/* Probability of still getting DBID in CF */
/* Probability of getting only NBID but not DBID in CF */

matrix; z1 = [y_LC / y_Pa_p / y_PF_p ] $
matrix; z1A = T*z1 $
calc; p22_p = Mvn(z1A,Omega3A)/p_DBID $

matrix; z0 = [y_LC / y_Pa_p / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_pLo / y_PF_pLo ] $
matrix; z1A = T*z1 $
calc; p22_pLo = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_pLo / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_pHi / y_PF_pHi ] $
matrix; z1A = T*z1 $
calc; p22_pHi = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_pHi / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_f / y_PF_f ] $
matrix; z1A = T*z1 $
calc; p22_f = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_f / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_fLo / y_PF_fLo ] $
matrix; z1A = T*z1 $
calc; p22_fLo = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_fLo / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_fHi / y_PF_fHi ] $
matrix; z1A = T*z1 $
calc; p22_fHi = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_fHi / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

/* Collect results and clean up. */
matrix; P_p(2,2) = p22_p $
matrix; P_pLo(2,2) = p22_pLo $
matrix; P_pHi(2,2) = p22_pHi $
matrix; P_f(2,2) = p22_f $
matrix; P_fLo(2,2) = p22_fLo $
matrix; P_fHi(2,2) = p22_fHi $
calc; delete p22_p, p22_pLo, p22_pHi $
calc; delete p22_f, p22_fLo, p22_fHi $

matrix; P_p(3,2) = p32_p $
matrix; P_pLo(3,2) = p32_pLo $
matrix; P_pHi(3,2) = p32_pHi $
matrix; P_f(3,2) = p32_f $
matrix; P_fLo(3,2) = p32_fLo $
matrix; P_fHi(3,2) = p32_fHi $
calc; delete p32_p, p32_pLo, p32_pHi $
calc; delete p32_f, p32_fLo, p32_fHi $

/* Probability of getting only pleural in CF given
DBID in BL */

/* Use Omega4 matrix */
matrix; T = [-1,0,0,0/ 0,1,0,0/ 0,0,1,0/ 0,0,0,1] $
matrix; Omega4A = T*Omega4*T $
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```
matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_p] $
matrix; z1 = [y_LC/ y_Pa_p/ y_PFT/ y_Pl_p] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_p = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_pLo] $
matrix; z1 = [y_LC/ y_Pa_pLo/ y_PFT/ y_Pl_pLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_pLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_pHi] $
matrix; z1 = [y_LC/ y_Pa_pHi/ y_PFT/ y_Pl_pHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_pHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_f] $
matrix; z1 = [y_LC/ y_Pa_f/ y_PFT/ y_Pl_f] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_f = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_fLo] $
matrix; z1 = [y_LC/ y_Pa_fLo/ y_PFT/ y_Pl_fLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_fLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_fHi] $
matrix; z1 = [y_LC/ y_Pa_fHi/ y_PFT/ y_Pl_fHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_fHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

/* Collect results and clean up. */
matrix; P_p(4,2) = p42_p $
matrix; P_pLo(4,2) = p42_pLo $
matrix; P_pHi(4,2) = p42_pHi $
matrix; P_f(4,2) = p42_f $
matrix; P_fLo(4,2) = p42_fLo $
matrix; P_fHi(4,2) = p42_fHi $
calc; delete p42_p, p42_pLo, p42_pHi $
calc; delete p42_f, p42_fLo, p42_fHi $

/* Probability of NBID in BL */
matrix; T = [-1,0,0/ 0,1,0/ 0,0,-1] $
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $
matrix; Omega3A = T*Omega3*T $


matrix; z = [y_LC / y_Par / y_PFT] $
matrix; zA = T*z $
calc; p_NBID = Mvn(zA,Omega3A) $

/* Probability of NBID in BL and NBID in CF */

matrix; z0 = [y_LC / y_Pa_p / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_p = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_pLo / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_pLo = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_pHi / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_pHi = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_f / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_f = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_fLo / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_fLo = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_fHi / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_fHi = Mvn(z0A,Omega3A)/p_NBID $

/* Collect results and clean up. */
matrix; P_p(3,3) = p33_p $
matrix; P_pLo(3,3) = p33_pLo $
matrix; P_pHi(3,3) = p33_pHi $
matrix; P_f(3,3) = p33_f $
matrix; P_fLo(3,3) = p33_fLo $
matrix; P_fHi(3,3) = p33_fHi $
calc; delete p33_p, p33_pLo, p33_pHi $
calc; delete p33_f, p33_fLo, p33_fHi $

/* Probability of Pl but not NBID in CF given NBID in BL */
/* Use Omega4 matrix */
matrix; T = [-1,0,0,0/ 0,1,0,0/ 0,0,-1,0/ 0,0,0,1] $
matrix; Omega4A = T*Omega4*T $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_p ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_p / y_PFT / y_Pl_p ] $
matrix; z1A = T*z1 $
calc; p43_p = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_pLo ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_pLo / y_PFT / y_Pl_pLo ] $
matrix; z1A = T*z1 $
calc; p43_pLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_pHi ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_pHi / y_PFT / y_Pl_pHi ] $
matrix; z1A = T*z1 $
calc; p43_pHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_f ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_f / y_PFT / y_Pl_f ] $
matrix; z1A = T*z1 $
calc; p43_f = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_fLo ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_fLo / y_PFT / y_Pl_fLo ] $
matrix; z1A = T*z1 $
calc; p43_fLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_fHi ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_fHi / y_PFT / y_Pl_fHi ] $
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```
matrix; z1A = T'z1 $
calc; p43_fHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

/* Collect results and clean up. */
matrix; P_p(4,3) = p43_p $
matrix; P_pLo(4,3) = p43_pLo $
matrix; P_pHi(4,3) = p43_pHi $
matrix; P_f(4,3) = p43_f $
matrix; P_fLo(4,3) = p43_fLo $
matrix; P_fHi(4,3) = p43_fHi $
calc; delete p43_p, p43_pLo, p43_pHi $
calc; delete p43_f, p43_fLo, p43_fHi $

/* Probability of pleural injury in BL */
/* Recreate 3x3 submatrix of Omega4 that gives only
   correlations of LC, Par, and Pl */
matrix; Omega3 = [1 /
                  rhoLCPar, 1/
                  rhoLCPle, rhoParPl, 1] $
matrix; T = [-1,0,0/ 0,-1,0/ 0,0,1] $
matrix; Omega3A = T'Omega3'T $
matrix; z0 = [y_LC / y_Par / y_Ple ] $
matrix; z0A = T'z0 $
calc; p_Pl = Mvn(z0A, Omega3A) $

/* Probability of Pl in CF given Pl in BL */
matrix; z1 = [y_LC / y_Par / y_Pl_p] $
matrix; z1A = T'z1 $
calc; p44_p = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_pLo] $
matrix; z1A = T'z1 $
calc; p44_pLo = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_pHi] $
matrix; z1A = T'z1 $
calc; p44_pHi = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_f] $
matrix; z1A = T'z1 $
calc; p44_f = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_fLo] $
matrix; z1A = T'z1 $
calc; p44_fLo = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_fHi] $
matrix; z1A = T'z1 $
calc; p44_fHi = Mvn(z1A,Omega3A)/p_Pl $

/* Collect results and clean up. */
matrix; P_p(4,4) = p44_p $
matrix; P_pLo(4,4) = p44_pLo $
matrix; P_pHi(4,4) = p44_pHi $
matrix; P_f(4,4) = p44_f $
matrix; P_fLo(4,4) = p44_fLo $
matrix; P_fHi(4,4) = p44_fHi $
calc; delete p44_p, p44_pLo, p44_pHi $
calc; delete p44_f, p44_fLo, p44_fHi $
```

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Dm5_ms8a_R2_r2_R2.do


```
* @RM500'
* DM5:  Computation of present discounted value (PDV)
* of 'past' non-FDD resolved and unresolved claims.
* Input files:  lv6; "Risk Free Interest Rate" ms7a
* This version is used ms7a as input file: No effect of smoking on Pleural
* Program modifies DM3
clear
prog drop _all
set rmsg off
set more off
set matsize 500


log using dm5_ms8a, replace

* (0) Liquidated value of unresolved claims (based on TDP)
* from [MatrixREV95.xls]Unresolved:
matrix U = (88400, 25400, 51500, 12500)
matrix colnames U = LC NBID DBID Pl
matrix rownames U = LiqVal

* Administrative costs per claim from [MatrixREV95.xls]admin_costs
matrix C = (577 \ 210 )
matrix rownames C = past unres
matrix colnames C = ad_cost
matrix li C


* (1) Compute discount factors
use Risk Free Interest Rate
* Drop 1988-1991 (Courts' Preliminary Orders cover only 1992+)
drop in 1/4
qui gen n = 2000 - _n
sort n
gen dFactor = 1 in 1
qui replace dF = dF[_n-1]*(1 + I/100) in 2/9
form dF %9.3f
sort y
drop n I
l

* (2) Merge with lv6; incl. admin costs and unresolved claims
merge year using lv6
drop _m

* Estimated Liquidated Values of Unresolved Claims
qui replace VR_LC = U[1,1] if y == 2000
qui replace VS_LC = U[1,1] if y == 2000
qui replace VR_NBID = U[1,2] if y == 2000
qui replace VS_NBID = U[1,2] if y == 2000
qui replace VR_DBID = U[1,3] if y == 2000
qui replace VS_DBID = U[1,3] if y == 2000
qui replace VR_Pl = U[1,4] if y == 2000
qui replace VS_Pl = U[1,4] if y == 2000

* Add admin costs of past resolved claims to LiqVals
qui replace VR_LC = VR_LC + C[1,1] if y < 2000
qui replace VR_NBID = VR_NBID + C[1,1] if y < 2000
qui replace VR_DBID = VR_DBID + C[1,1] if y < 2000
qui replace VR_Pl = VR_Pl + C[1,1] if y < 2000
qui replace VS_LC = VS_LC + C[1,1] if y < 2000
qui replace VS_NBID = VS_NBID + C[1,1] if y < 2000
qui replace VS_DBID = VS_DBID + C[1,1] if y < 2000
qui replace VS_Pl = VS_Pl + C[1,1] if y < 2000

* Add admin costs to unresolved claims to LiqVals
qui replace VR_LC = VR_LC + C[2,1] if y == 2000
qui replace VR_NBID = VR_NBID + C[2,1] if y == 2000
qui replace VR_DBID = VR_DBID + C[2,1] if y == 2000
qui replace VR_Pl = VR_Pl + C[2,1] if y == 2000
qui replace VS_LC = VS_LC + C[2,1] if y == 2000
qui replace VS_NBID = VS_NBID + C[2,1] if y == 2000
qui replace VS_DBID = VS_DBID + C[2,1] if y == 2000
qui replace VS_Pl = VS_Pl + C[2,1] if y == 2000

* (3) Compute PDV of Liq Val + Admin Costs by Dx and Year
qui replace VR_LC = VR_LC * dF
qui replace VR_NBID = VR_NBID * dF
qui replace VR_DBID = VR_DBID * dF
qui replace VR_Pl = VR_Pl * dF
qui replace VS_LC = VS_LC * dF
qui replace VS_NBID = VS_NBID * dF
qui replace VS_DBID = VS_DBID * dF
qui replace VS_Pl = VS_Pl * dF
drop dF

* (4) Convert to matrices (Note: Order needs to be conformal with
*     order of rows in subdiagonal P-matrices in ms7a and ms7)
* RICO
  qui replace YR_LC = 0 if YR_LC == .
  qui replace YR_NBID = 0 if YR_NBID == .
  qui replace YR_DBID = 0 if YR_DBID == .
  qui replace YR_Pl = 0 if YR_Pl == .
  mkmat YR_LC
  mkmat YR_NBID
  mkmat YR_DBID
  mkmat YR_Pl
  matrix YR = YR_LC, YR_DBID, YR_NBID, YR_Pl
  matrix drop YR_LC YR_NBID YR_DBID YR_Pl
  matrix colnames YR = LC DBID NBID Pl
  matrix rownames YR = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li YR, format(%8.0f) title("RICO Claims by Dx Year")

  qui replace VR_LC = 0 if VR_LC == .
  qui replace VR_NBID = 0 if VR_NBID == .
  qui replace VR_DBID = 0 if VR_DBID == .
  qui replace VR_Pl = 0 if VR_Pl == .
  mkmat VR_LC
  mkmat VR_NBID
  mkmat VR_DBID
  mkmat VR_Pl
  matrix VR = VR_LC, VR_DBID, VR_NBID, VR_Pl
  matrix drop VR_LC VR_NBID VR_DBID VR_Pl
  matrix colnames VR = LC DBID NBID Pl
  matrix rownames VR = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li VR, format(%8.0f) title("RICO PDV LiqVal+AdmCost by Dx Year")

* SFA
  qui replace YS_LC = 0 if YS_LC == .
  qui replace YS_NBID = 0 if YS_NBID == .
  qui replace YS_DBID = 0 if YS_DBID == .
  qui replace YS_Pl = 0 if YS_Pl == .
  mkmat YS_LC
  mkmat YS_NBID
  mkmat YS_DBID
  mkmat YS_Pl
  matrix YS = YS_LC, YS_DBID, YS_NBID, YS_Pl
  matrix drop YS_LC YS_NBID YS_DBID YS_Pl
  matrix colnames YS = LC DBID NBID Pl
```

Dm5_ms8a_R2_r2_R2.do

```
  matrix rownames YS = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li YS, format(%8.0f) title("SFA Claims by Dx Year")

  qui replace VS_LC = 0 if VS_LC == .
  qui replace VS_NBID = 0 if VS_NBID == .
  qui replace VS_DBID = 0 if VS_DBID == .
  qui replace VS_P1 = 0 if VS_P1 == .
  mkmat VS_LC
  mkmat VS_DBID
  mkmat VS_NBID
  mkmat VS_P1
  matrix VS = VS_LC, VS_DBID, VS_NBID, VS_P1
  matrix drop VS_LC VS_NBID VS_DBID VS_P1
  matrix colnames VS = LC DBID NBID P1
  matrix rownames VS = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li VS, format(%8.0f) title("SFA PDV LiqVal+AdmCost by Dx Year")

* (4) Get P-matrix from ms7a
* Note: This file has a slightly format than cr1 (as used in ms4)
drop _all
use ms8a_R2_r2_R1
* Use only "past" estimates of P-matrix
keep if Era == 0
l,nod
* Loop through (low,med,high) (n = 1,2,3)
qui gen double PDV_RICO = .
qui gen double PDV_SFA = .
form PDV* %9.1f
matrix P = J(4,4,0)
prog def getPDV
  global n = 1
  while $n <= 3 {
    matrix P[1,1] = p11[$n]
    matrix P[2,1] = p21[$n]
    matrix P[2,2] = p22[$n]
    matrix P[3,1] = p31[$n]
    matrix P[3,2] = p32[$n]
    matrix P[3,3] = p33[$n]
    matrix P[4,1] = p41[$n]
    matrix P[4,2] = p42[$n]
    matrix P[4,3] = p43[$n]
    matrix P[4,4] = p44[$n]
di "case: ", $n
matrix li P
* Compute PDV for both RICO & SFA
    matrix DR = trace(VR * (I(4) - P) * YR')
    qui replace PDV_RICO = DR[1,1]/1e6 in $n
    matrix DS = trace(VS * (I(4) - P) * YS')
    qui replace PDV_SFA = DS[1,1]/1e6 in $n

* Save results in median case (n=2) for graphs and tables
    if $n == 2 {
* FR and FS are annual financial injury from RICO and SFA
      matrix FR = vecdiag(VR * (I(4) - P) * YR')
      matrix FS = vecdiag(VS * (I(4) - P) * YS')
      matrix FR = FR'
      matrix FS = FS'
* ZR and ZS are annual claims by Dx in counterfactual scenario (median case)
      matrix ZR = P * YR'
      matrix ZS = P * YS'
      matrix ZR = ZR'
      matrix ZS = ZS'
    }

    global n = $n + 1
  }
end
getPDV
l Era Range PDV_R PDV_S,nod

* Display results for median case for graphs and tables
drop _all
* Financial injury by year
svmat FR
svmat FS
qui replace FR = FR/1e6
qui replace FS = FS/1e6
gen int year = _n + 1991
svmat ZR
ren ZR1 ZR_LC
ren ZR2 ZR_DBID
ren ZR3 ZR_NBID
ren ZR4 ZR_P1
svmat ZS
ren ZS1 ZS_LC
ren ZS2 ZS_DBID
ren ZS3 ZS_NBID
ren ZS4 ZS_P1
order y FR FS ZR* ZS*
form F* Z* %8.0f
l y F*,nod
l y Z*,nod

save Claims_P,replace

log close
\032
```

dm5_ms8a.log


```
. * (0) Liquidated value of unresolved claims (based on TDP)
. * from [MatrixREV95.xls]Unresolved:
. matrix U = (88400, 25400, 51500, 1250

. matrix colnames U = LC NBID DBID P1

. matrix rownames U = LiqVal

. * Administrative costs per claim from [MatrixREV95.xls]admin_costs
. matrix C = (577 \ 210 )

. matrix rownames C = past unres

. matrix colnames C = ad_cost

. matrix li C

C[2,1]
       ad_cost
 past      577
unres      210

.
.
. * (1) Compute discount factors
. use Risk Free Interest Rate

. * Drop 1988-1991 (Courts' Preliminary Orders cover only 1992+)
. drop in 1/4
(4 observations deleted)

. qui gen n = 2000 - _n

. sort n

. gen dFactor = 1 in 1
(8 missing values generated)

. qui replace dF = dF[_n-1]*(1 + I/100) in 2/9

. form dF %9.3f

. sort y

. drop n I

. l

        year    dFactor
  1.    1992      1.418
  2.    1993      1.370
  3.    1994      1.331
  4.    1995      1.281
  5.    1996      1.213
  6.    1997      1.153
  7.    1998      1.096
  8.    1999      1.045
  9.    2000      1.000

.
. * (2) Merge with lv6; incl. admin costs and unresolved claims
. merge year using lv6

. drop _m

. * Estimated Liquidated Values of Unresolved Claims
. qui replace VR_LC = U[1,1] if y == 2000

. qui replace VS_LC = U[1,1] if y == 2000

. qui replace VR_NBID = U[1,2] if y == 2000

. qui replace VS_NBID = U[1,2] if y == 2000

. qui replace VR_DBID = U[1,3] if y == 2000

. qui replace VS_DBID = U[1,3] if y == 2000

. qui replace VR_P1 = U[1,4] if y == 2000

. qui replace VS_P1 = U[1,4] if y == 2000

.
. * Add admin costs of past resolved claims to LiqVals
. qui replace VR_LC = VR_LC + C[1,1] if y < 2000

. qui replace VR_NBID = VR_NBID + C[1,1] if y < 2000

. qui replace VR_DBID = VR_DBID + C[1,1] if y < 2000

. qui replace VR_P1 = VR_P1 + C[1,1] if y < 2000

. qui replace VS_LC = VS_LC + C[1,1] if y < 2000

. qui replace VS_NBID = VS_NBID + C[1,1] if y < 2000

. qui replace VS_DBID = VS_DBID + C[1,1] if y < 2000

. qui replace VS_P1 = VS_P1 + C[1,1] if y < 2000

.
. * Add admin costs to unresolved claims to LiqVals
. qui replace VR_LC = VR_LC + C[2,1] if y == 2000

. qui replace VR_NBID = VR_NBID + C[2,1] if y == 2000

. qui replace VR_DBID = VR_DBID + C[2,1] if y == 2000

. qui replace VR_P1 = VR_P1 + C[2,1] if y == 2000

. qui replace VS_LC = VS_LC + C[2,1] if y == 2000

. qui replace VS_NBID = VS_NBID + C[2,1] if y == 2000

. qui replace VS_DBID = VS_DBID + C[2,1] if y == 2000

. qui replace VS_P1 = VS_P1 + C[2,1] if y == 2000

.
. * (3) Compute PDV of Liq Val + Admin Costs by Dx and Year
. qui replace VR_LC = VR_LC * dF

. qui replace VR_NBID = VR_NBID * dF

. qui replace VR_DBID = VR_DBID * dF
```


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dm5_ms8a.log

```
. qui replace VR_Pl = VR_Pl * dF

. qui replace VS_LC = VS_LC * dF

. qui replace VS_NBID = VS_NBID * dF

. qui replace VS_DBID = VS_DBID * dF

. qui replace VS_Pl = VS_Pl * dF

. drop dF

. * (4) Convert to matrices (Note: Order needs to be conformal with
. *     order of rows in subdiagonal P-matrices in ms7a and ms7)
. * RICO
.   qui replace YR_LC = 0 if YR_LC == .

.   qui replace YR_NBID = 0 if YR_NBID == .

.   qui replace YR_DBID = 0 if YR_DBID == .

.   qui replace YR_Pl = 0 if YR_Pl == .

.   mkmat YR_LC

.   mkmat YR_NBID

.   mkmat YR_DBID

.   mkmat YR_Pl

.   matrix YR = YR_LC, YR_DBID, YR_NBID, YR_Pl

.   matrix drop YR_LC YR_NBID YR_DBID YR_Pl

.   matrix colnames YR = LC DBID NBID Pl

.   matrix rownames YR = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li YR, format(%8.0f) title("RICO Claims by Dx Year")

YR[9,4]:  RICO Claims by Dx Year
           LC    DBID    NBID      Pl
1992        0       0       0       0
1993        0       0       0       0
1994        0       0       0       0
1995        0       0       0       0
1996      460      18      50      41
1997      852     601    1165    1024
1998     1408    2386    3823    3811
1999     2265   16423   24116    8291
2000     2960   15359   24575   10674

.
.   qui replace VR_LC = 0 if VR_LC == .

.   qui replace VR_NBID = 0 if VR_NBID == .

.   qui replace VR_DBID = 0 if VR_DBID == .

.   qui replace VR_Pl = 0 if VR_Pl == .

.   mkmat VR_LC

.   mkmat VR_NBID

.   mkmat VR_DBID

.   mkmat VR_Pl

.   matrix VR = VR_LC, VR_DBID, VR_NBID, VR_Pl

.   matrix drop VR_LC VR_NBID VR_DBID VR_Pl

.   matrix colnames VR = LC DBID NBID Pl

.   matrix rownames VR = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li VR, format(%8.0f) title("RICO PDV LiqVal+AdmCost by Dx Year")

VR[9,4]:  RICO PDV LiqVal+AdmCost by Dx Year
           LC    DBID    NBID      Pl
1992        0       0       0       0
1993        0       0       0       0
1994        0       0       0       0
1995        0       0       0       0
1996   106213   61370   31035   15261
1997   101419   58751   29730   14549
1998    96865   55924   28138   13853
1999    92414   52990   26774   12980
2000    88610   51710   25610   12710

.
. * SFA
.   qui replace YS_LC = 0 if YS_LC == .

.   qui replace YS_NBID = 0 if YS_NBID == .

.   qui replace YS_DBID = 0 if YS_DBID == .

.   qui replace YS_Pl = 0 if YS_Pl == .

.   mkmat YS_LC

.   mkmat YS_NBID

.   mkmat YS_DBID

.   mkmat YS_Pl

.   matrix YS = YS_LC, YS_DBID, YS_NBID, YS_Pl

.   matrix drop YS_LC YS_NBID YS_DBID YS_Pl

.   matrix colnames YS = LC DBID NBID Pl

.   matrix rownames YS = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li YS, format(%8.0f) title("SFA Claims by Dx Year")

YS[9,4]:  SFA Claims by Dx Year
           LC    DBID    NBID      Pl
1992       14       1       0       0
1993       17       2       0       0
1994      555       6       3       0
1995      933      44      30      21
1996     1612    1003    3356    3722
1997     2405    4262    7262    5453
```

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dm5_ms8a.log

```
1998    2111    3967    6992    5907
1999    2653   22284   35603   12023
2000    3685   20135   30318   13653

. qui replace VS_LC = 0 if VS_LC == .

. qui replace VS_NBID = 0 if VS_NBID == .

. qui replace VS_DBID = 0 if VS_DBID == .

. qui replace VS_Pl = 0 if VS_Pl == .

. mkmat VS_LC

. mkmat VS_DBID

. mkmat VS_NBID

. mkmat VS_Pl

. matrix VS = VS_LC, VS_DBID, VS_NBID, VS_Pl

. matrix drop VS_LC VS_NBID VS_DBID VS_Pl

. matrix colnames VS = LC DBID NBID Pl

. matrix rownames VS = 1992 1993 1994 1995 1996 1997 1998 1999 2000

. matrix li VS, format(%8.0f) title("SFA PDV LiqVal+AdmCost by Dx Year")

VS[9,4]:  SFA PDV LiqVal+AdmCost by Dx Year
          LC      DBID     NBID      Pl
1992  159788     71719      818     818
1993  131377     69287      790     790
1994  115516     72882    34051     768
1995  113591     69612    33136   16613
1996  106310     62012    31374   15464
1997  101889     59378    30011   14811
1998   97037     56279    28231   13909
1999   92715     52772    26779   12661
2000   88610     51710    25610   12710

. * (4) Get P-matrix from ms7a
. * Note: This file has a slightly format than cr1 (as used in dm3)
. drop _all

. use ms8a_R2_r2_R1

. * Use only `past' estimates of P-matrix
. keep if Era == 0
(3 observations deleted)

. l,nod

        Era     Range       p11       p21       p22       p31       p32
>       p33       p41       p42       p43       p44
  1.   Past        Lo    0.9790    0.0070    0.9923    0.0090    0.0040
>    0.9956    0.0035    0.0031    0.0029    1.0000
  2.   Past       Med    0.9790    0.0070    0.9923    0.0090    0.0040
>    0.9956    0.0035    0.0031    0.0029    1.0000
  3.   Past        Hi    0.9790    0.0070    0.9923    0.0090    0.0040
>    0.9956    0.0035    0.0031    0.0029    1.0000
```

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```
. * Loop through (low,med,high) (n = 1,2,3)
. qui gen double PDV_RICO = .

. qui gen double PDV_SFA = .

. form PDV %9.1f

. matrix P = J(4,4,0)

. prog def getPDV
  1.    global n = 1
  2.    while $n <= 3 {
  3.      matrix P[1,1] = p11[$n]
  4.      matrix P[2,1] = p21[$n]
  5.      matrix P[2,2] = p22[$n]
  6.      matrix P[3,1] = p31[$n]
  7.      matrix P[3,2] = p32[$n]
  8.      matrix P[3,3] = p33[$n]
  9.      matrix P[4,1] = p41[$n]
 10.      matrix P[4,2] = p42[$n]
 11.      matrix P[4,3] = p43[$n]
 12.      matrix P[4,4] = p44[$n]
 13. di "case: ", $n
 14. matrix li P
 15. * Compute PDV for both RICO & SFA
.      matrix DR = trace(VR * (I(4) - P) * YR')
 16.      qui replace PDV_RICO = DR[1,1]/1e6 in $n
 17.      matrix DS = trace(VS * (I(4) - P) * YS')
 18.      qui replace PDV_SFA = DS[1,1]/1e6 in $n
 19
. * Save results in median case (n=2) for graphs and tables
.      if $n == 2 {
 20. * FR and FS are annual financial injury from RICO and SFA
.        matrix FR = vecdiag(VR * (I(4) - P) * YR')
 21.        matrix FS = vecdiag(VS * (I(4) - P) * YS')
 22.        matrix FR = FR'
 23.        matrix FS = FS'
 24. * ZR and ZS are annual claims by Dx in counterfactual scenario (median cas
> e)
.        matrix ZR = P * YR'
 25.        matrix ZS = P * YS'
 26.        matrix ZR = ZR'
 27.        matrix ZS = ZS'
 28.      }
 29.
.      global n = $n + 1
 30.   }
 31. end

. getPDV
case:  1

P[4,4]
           c1          c2          c3          c4
r1  .97899997           0           0           0
r2       007   .99229997           0           0
r3       .009        .004   .99559999           0
r4      .0035       .0031       .0029           1
case:  2

P[4,4]
           c1          c2          c3          c4
r1  .97899997           0           0           0
r2       007   .99229997           0           0
r3       .009        .004   .99559999           0
```

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dm5_ms8a.log

```
r4      .0035      .0031      .0029          1
case:  3

P[4,4]
          c1          c2          c3
r1  .97899997          0           0          0
r2       .007   .99229997          0          0
r3       .009        .004   .99559999          0
r4      .0035       .0031       .0029          1

. l Era Range PDV_R PDV_S,nod

         Era     Range    PDV_RICO     PDV_SFA
 1.     Past       Lo        23.6        39.3
 2.     Past      Med        23.6        39.3
 3.     Past       Hi        23.6        39.3


. * Display results for median case for graphs and tables
. drop _all

. * Financial injury by year
. svmat FR
number of observations will be reset to 9
Press any key to continue, or Break to abort
obs was 0, now 9

. svmat FS

. qui replace FR = FR/1e6

. qui replace FS = FS/1e6

. gen int year = _n + 1991

. svmat ZR

. ren ZR1 ZR_LC

. ren ZR2 ZR_DBID

. ren ZR3 ZR_NBID

. ren ZR4 ZR_P1

. svmat ZS

. ren ZS1 ZS_LC

. ren ZS2 ZS_DBID

. ren ZS3 ZS_NBID

. ren ZS4 ZS_P1

. order y FR FS ZR* ZS*

. form F* Z* %8.0f

. l y F*,nod

        year       FR1        FS1
 1.     1992         0          0
 2.     1993         0          0
 3.     1994         0          1
 4.     1995         0          1
 5.     1996   [illegible]  [illegible]
 6.     1997   [illegible]  [illegible]
 7.     1998         3   [illegible]
 8.     1999   [illegible]  [illegible]
 9.     2000         9         12

. l y Z*,nod

        year    ZR_LC   ZR_DBID   ZR_NBID     ZR_P1     ZS_LC   ZS_DBID    ZS_
> NBID     ZS_P1
 1.     1992        0         0         0         0        14         1
>    0         0
 2.     1993        0         0         0         0        17         2
>    0         0
 3.  [illegible] [illegible]  0         0         0       543        10
> [illegible] [illegible]
 4.  [illegible] [illegible] [illegible] 0        0       913        50
> [illegible] [illegible]
 5.  [illegible]  450        21        54        43      1578      1007
> 3360      3740
 6.     1997      834       602      1170      1032      2354      4246
> 7269      5496
 7.     1998     1378      2377      3828      3834      2067      3951
> 6996      5947
 8.     1999     2217     16312     24096      8420      2597     22131      3
> 5559     12205
 9.     2000     2898     15261     24555     10803      3608     20006      3
> 0298     13816

. save Claims_P,replace
(Note: file Claims_P.dta not found)
file Claims_P.dta saved

.
. log close
```


go to:
> tab 73, p. 5 (formatted)
WEW 3, p. 4, fn 14

Wecker changes:

- remove asbestos-specific quit and initiation rate effects (see p. 15, 26 this tab)
  R2: 3,0 → 1,0 ; r2: 0,9 → 1,0 — IR past, QR past
- remove general quit rate effect (see p. 26 this tab)
  R1: 1.5 → 1.0

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Calc. To 73, p6

nir5_r2_r1.do

```
* ©RM500
* nir5: BL-CF differences in proportion of ever-smokers and
* mean smoke-years exposure of claimants in HRA audit files
* Relative risk initiation model hC(t) = r1*hB(t) if year >= T1
* hC(t) = r2*hB(t) if year >= T2, where T2 > T1
* hC(t) = r3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 2009)
* Age distribution for future claimants from age9.dta
* Baseline cumulative smoking initiation curve from nir3.dta
* crossover insulators excluded

* Scenario    pre-88 misconduct    Estimate    r1     r2     r3
*    BL            -                  -        1.0    1.0    1.0
*    CF           yes                low       1.0    0.8    1.0
*    CF           yes                mid       0.9    0.7    1.0
*    CF           yes                high      0.8    0.6    1.0

clear
prog drop _all
set rmsg off
set more off
set matsize 200

log using nir5, replace

* (1) get distribution of birth year of all claimants from age9.dta
use "age9"
keep year AllFutur
mkmat year AllFutur
matrix pi = year,AllFutur
matrix drop year AllFutur
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix list pi

* No correction here for year first exposed to asbestos
* (Comparison of output of nir2 and nir3 shows little effect)

* (2) Get baseline cumulative initiation curve from nir3.dta
drop _all
use nir3_r2_r1
gen SB = 1 - FB
lab var x "Age"

* (3) Computation of initation rates in CF scenario
* Cutoff years for decrease in initiation rates are $T1, max($T2,Ylexp), max($T3,Ylexp)
* Relative decrease in initiation rate (on or after year T1) is global variable $r1
* Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global variable $
r2
* Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global variable $
r3

* SB(x) cumulative proportion not smoking through age x in BL scenario.
keep x SB
sort x
order x SB
* Set xMax
* Age 50 set as cutoff for ever smoking
global xMax = 50
drop if x > $xMax
qui sum x
global xMin = r(min)

global N = _N

* Lifetime probability of not smoking by age $xMax in BL scenario
  global PB = SB[$N]
* Conditional survival curve in BL scenario
  qui gen SB_ = 1 - (1 - SB)/(1 - $PB)
  qui sum SB_
* Mean age started among those starting by age $xMax in BL scenario
  global XB = $xMin + r(mean)*$N
  di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
  di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
  drop SB_

* SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
qui gen SBr1 = .
qui gen SBr2 = .
qui gen SBr3 = .
qui gen SC = .

prog def getSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global r1 = $_4
  global r2 = $_5
  global r3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }

* Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
  qui replace SBr1 = SB^$r1
  qui replace SBr2 = SB^$r2
  qui replace SBr3 = SB^$r3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t))^(r1-r2)*SB(mi
n(x,T3-t))^(r2-r3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
    local p = pi['i',2]
*   'x1' = age at T1
    local x1 = $T1 - 't'
*   'x2' = age at T2
    local x2 = min($T2 - 't',$xMax)
*   'x3' = age at T3
    local x3 = min($T3 - 't',$xMax)
* Note: x3 >= x2 >= x1
*       'v1' = obs# at age at T1
        local u1 = 'x1' - $xMin
        local v1 = 'x1' - $xMin + 1
*       'v2' = obs# at age at T2
        local u2 = 'x2' - $xMin
        local v2 = 'x2' - $xMin + 1
*       'v3' = obs# at age at T3
        local u3 = 'x3' - $xMin
        local v3 = 'x3' - $xMin + 1
* Note: u3 >= u2 >= u1
        local A1 = SB['u1']^(1-$r1)
        local A2 = SB['u2']^($r1-$r2)
```

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nir5_r2_r1.do

```
      local A3 = SB['u3']^(Sr2-Sr3)
* DEBUGGING
*       di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1', 'u2', 'u3
',"v1,v2,v3= ", 'v1', 'v2', 'v3'
*   Null Case:
    if 'x1' >= $xMax {
* DEBUGGING
*      di "Null case"
      qui replace SC = SC + 'p' * SB
    }
    else {
      if 'u3' <= 0 {
* Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
* DEBUGGING
*      di "Case A"
        qui replace SC = SC + 'p' * SBr3
      }
      else {
        if 'u3' > 0 & 'u2' <= 0 {
*      di "Case B"
* Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
* DEBUGGING
          qui replace SC = SC + 'p' * SBr2 in 1/'u3'
          if 'v3' <= $N {
            qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
          }
        }
        else {
          if 'u2' > 0 & 'u1' <= 0 {
* Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*      di "Case C"
            qui replace SC = SC + 'p' * SBr1 in 1/'u2'
            if 'v2' <= 'u3' {
              qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
            }
            if 'v3' <= $N {
              qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
            }
          }
          else {
* Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
* DEBUGGING
*      di "Case D"
            qui replace SC = SC + 'p' * SB in 1/'u1'
            qui replace SC = SC + 'p' * SBr1 * 'A1' in 'v1'/'u2'
            if 'v2' <= 'u3' {
              qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'v2'/'u3'
            }
            if 'v3' <= $N {
              qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3'/$N
            }
          }
        }
      }
    }

    local i = 'i' + 1
  }
* Lifetime probability of not smoking by age $xMax in CF scenario
  global PC = SC[$N]
* Conditional survival curve in CF scenario
  tempvar SC_
  qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
  qui sum 'SC_'
* Mean age started among those starting by age $xMax in CF scenario
  global XC = $xMin + r(mean)*$N
  di %7.0f $T1, %7.0f $T2, %7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3f $PC - $PB, %7
.2f $XB - $XC
end

prog def rangeSC
  di "     T1      T2      T3     r1      r2      r3   deltaP deltaX"
  getSC 1954 1963 2001 1.0 1.0 1.0
  getSC 1954 1963 2001 1.0 0.9 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  qui gen FC_lo = 1 - SC
  lab var FC_lo "FC (no post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.8 0.8
  qui gen FC7lo = 1 - SC
  lab var FC7lo "FC (post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.7 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  getSC 1954 1963 2001 0.9 0.9 1.0
  getSC 1954 1963 2001 0.9 0.8 1.0

  *****Wecker Change: replace 0.7 and 0.9with 1.0*****

  *getSC 1954 1963 2001 0.9 0.7 1.0
   getSC 1954 1963 2001 1.0 1.0 1.0

  *************End Wecker Change***********

  qui gen FC_ = 1 - SC
  lab var FC_ "FC (no post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.7 0.7
  qui gen FC7 = 1 - SC
  lab var FC7 "FC (post-2000 Misconduct) mid est."
  getSC 1954 1963 2001 0.9 0.6 1.0
  getSC 1954 1963 2001 0.8 0.8 1.0
  getSC 1954 1963 2001 0.8 0.7 1.0
  getSC 1954 1963 2001 0.8 0.6 1.0
  qui gen FC_hi = 1 - SC
  lab var FC_hi "FC (no post-2000 Misconduct) high est."
  getSC 1954 1963 2001 0.8 0.6 0.6
  qui gen FC7hi = 1 - SC
  lab var FC7hi "FC (post-2000 Misconduct) high est."

end

rangeSC

qui gen FB = 1 - SB
* Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumulative Proport
ion Who Have Begun to Smoke")saving(nir5a,replace)
gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumulative Propor
tion Who Have Begun to Smoke")saving(nir5b,replace)
keep x F*
form x %6.0f
form F* %7.3f
save nir5_r2_r1, replace
* List data
l,nod

* Compute changes in proportion who ever smoked
global N = _N
* Baseline scenario:
di %9.3f FB[$N]
```


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nir5_r2_r1.do

```
prog def Results
 di "---        Decrease in proportion smoked       ---"
 di "Post-2000            Low          Middle          High"
 di "Misconduct           Est.         Est.            Est."
 di " Yes    ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[$N] - FC7hi[$N]
]
 di " No     ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[$N] - FC_hi[$N]
]
end
Results


log close
.\032
```


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nir5.log

```
. * (1) get distribution of birth year of all claimants from age9.dta
. use "age9"

. keep year AllFutur

. mkmat year AllFutur

. matrix pi = year,AllFutur

. matrix drop year AllFutur

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix list pi

pi[72,2]
             t       pi(t)
 r1       1900  .00004113
 r2       1901  .00002101
 r3       1902  .00003102
 r4       1903  .00004538
 r5       1904  .00006578
 r6       1905  .00009443
 r7       1906  .00013421
 r8       1907   .0001888
 r9       1908  .00026279
r10       1909  .00036178
r11       1910  .00049251
r12       1911  .00066282
r13       1912  .00088162
r14       1913  .00115874
r15       1914  .00150459
r16       1915  .00192976
r17       1916  .00244442
r18       1917  .00305756
r19       1918  .00377616
r20       1919  .00460425
r21       1920  .00554198
r22       1921  .00658479
r23       1922  .00772278
r24       1923  .00894043
r25       1924  .01021674
r26       1925  .01152602
r27       1926  .01283937
r28       1927  .01412696
r29       1928   .0153611
r30       1929  .01652004
r31       1930   .0175923
r32       1931  .01858097
r33       1932  .01950742
r34       1933  .02041352
r35       1934  .02136119
r36       1935  .02242851
r37       1936  .02370143
r38       1937  .02526133
r39       1938  .02716919
r40       1939   .0294484
r41       1940  .03206937
r42       1941  .03493946
r43       1942  .03790151
r44       1943  .04074331
r45       1944  .04321824
r46       1945  [illegible]
r47       1946  [illegible]
r48       1947  [illegible]
r49       1948  [illegible]
r50       1949  .04289862
r51       1950  .03982827
r52       1951  .03601309
r53       1952  .03170149
r54       1953  .02716146
r55       1954   .0226488
r56       1955  .01838121
r57       1956  .01452142
r58       1957  .01117046
r59       1958  .00837034
r60       1959  [illegible]
r61       1960  [illegible]
r62       1961  [illegible]
r63       1962  [illegible]
r64       1963  .00137566
r65       1964  .00090207
r66       1965  .00058381
r67       1966  .00037486
r68       1967   .0002404
r69       1968  .00015518
r70       1969  .00010166
r71       1970   .0000681
r72       1971  .00017831

.
. * No correction here for year first exposed to asbestos
. * (Comparison of output of nir2 and nir3 shows little effect)

. * (2) Get baseline cumulative initiation curve from nir3.dta
. drop _all

. use nir3_r2_r1

. gen SB = 1 - FB

. lab var x "Age"

.
. * (3) Computation of initation rates in CF scenario
. * Cutoff years for decrease in initiation rates are $T1, max($T2,Y1exp), max(
> $T3,Y1exp)
. * Relative decrease in initiation rate (on or after year T1) is global variab
> le $r1
. * Relative decrease in initiation rate (on or after max(T2,Y1exp) ) is global
>  variable $r2
. * Relative decrease in initiation rate (on or after max(T3,Y1exp) ) is global
>  variable $r3
.
. * SB(x) cumulative proportion not smoking through age x in BL scenario.
. keep x SB

. sort x

. order x SB

. * Set xMax
. * Age 50 set as cutoff for ever smoking
. global xMax = 50
```


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nir5.log

```
. drop if x > $xMax
(0 observations deleted)

. qui sum x

. global xMin = r(min)

. global N = _N

. * Lifetime probability of not smoking by age $xMax in BL scenario
.   global PB = SB[$N]

. * Conditional survival curve in BL scenario
.   qui gen SB_ = 1 - (1 - SB)/(1 - $PB)

.   qui sum SB_

. * Mean age started among those starting by age $xMax in BL scenario
.   global XB = $xMin + r(mean)*$N

.   di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
Probability of not smoking (by age 50) =    0.243

.   di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
Mean age started (among those starting by age 50) =      20.7

.   drop SB_

.

.

. * SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
. qui gen SBr1 = .

. qui gen SBr2 = .

. qui gen SBr3 = .

. qui gen SC = .

.
. prog def getSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
.   global T1 = $_1
  2.    global T2 = $_2
  3.    global T3 = $_3
  4.    global r1 = $_4
  5.    global r2 = $_5
  6.    global r3 = $_6
  7. * Check T3 > T2 > T1
.   if $T2 <= $T1 | $T3 <= $T2 {
  8.       di "Invalid ",%9.0f $T1,$T2,$T3
  9.       exit
 10.       }
 11.
. * Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
.   qui replace SBr1 = SB^$r1
 12.    qui replace SBr2 = SB^$r2
 13.    qui replace SBr3 = SB^$r3
 14.    qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t)
> )^(r1-r2)*SB(min(x,T3-t))^(r2-r3) for all x
. * Sum over index 'i' (rows of pi)
.   local i = 1
 16.   while 'i' <= $m {
 17.     local t = pi['i',1]
 18.     local p = pi['i',2]
 19. * 'x1' = age at T1
.   local x1 = min($T1 - 't',$xMax)
 20. * 'x2' = age at T2
.   local x2 = min($T2 - 't',$xMax)
 21. * 'x3' = age at T3
.   local x3 = min($T3 - 't',$xMax)
 22. * Note: x3 >= x2 >= x1
.     'v1' = obs# at age at T1
.     local u1 = 'x1' - $xMin
 23.       local v1 = 'x1' - $xMin + 1
.       'v2' = obs# at age at T2
 24.     local u2 = 'x2' - $xMin
 25.       local v2 = 'x2' - $xMin + 1
 26. *     'v3' = obs# at age at T3
.     local u3 = 'x3' - $xMin
 27.       local v3 = 'x3' - $xMin + 1
 28. * Note: u3 >= u2 >= u1
.     local A1 = SB['u1']^(1-$r1)
 29.       local A2 = SB['u2']^($r1-$r2)
 30.       local A3 = SB['u3']^($r2-$r3)
 31. * DEBUGGING
. *       di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1'
> , 'u2', 'u3',"v1,v2,v3= ", 'v1', 'v2', 'v3'
. *   Null Case:
.     if 'x1' >= $xMax {
 32. * DEBUGGING
. *       di "Null case"
.       qui replace SC = SC + 'p' * SB
 33.       }
 34.       else {
 35.         if 'u3' <= 0 {
 36. * Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
. * DEBUGGING
. *       di "Case A"
.         qui replace SC = SC + 'p' * SBr3
 37.         }
 38.         else {
 39.           if 'u3' > 0 & 'u2' <= 0 {
 40. *       di "Case B"
. * Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
. * DEBUGGING
.             qui replace SC = SC + 'p' * SBr2 in 1/'u3'
 41.               if 'v3' <= $N {
 42.                 qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
 43.               }
 44.             }
 45.             else {
 46.               if 'u2' > 0 & 'u1' <= 0 {
 47. * Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
. *       di "Case C"
.                 qui replace SC = SC + 'p' * SBr1 in 1/'u2'
 48.                   if 'v2' <= 'u3' {
 49.                     qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
 50.                   }
 51.                   if 'v3' <= $N {
 52.                     qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
 53.                   }
 54.               }
 55.               else {
 56. * Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
```

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```
. *     di "Case D"
          qui replace SC = SC + `p' * SB in 1/`u1'
             qui replace SC = SC + `p' * SBr1 * `A1' in `v1'/`u2'
             if `v2' <= `u3' {
                qui replace SC = SC + `p' * SBr2 * `A1' * `A2' in `v2'/`u3'
             }
             if `v3' <= $N {
                qui replace SC = SC + `p' * SBr3 * `A1' * `A2' * `A3' in `v3
> '/$N
             }
           }
         }
       }
     }

      local i = `i' + 1
   }
 * Lifetime probability of not smoking by age $xMax in CF scenario
.   global PC = SC[$N]
 * Conditional survival curve in CF scenario
.   tempvar SC_
   qui gen `SC_' = 1 - (1 - SC)/(1 - $PC)
   qui sum `SC_'
 * Mean age started among those starting by age $xMax in CF scenario
.   global XC = $xMin + r(mean)*$N
    di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3
> f $PC - $FB, %7.2f $XB - $XC
 end

. prog def rangeSC
    di "      T1       T2       T3       r1       r2       r3    deltaP deltaX"
    getSC 1954 1963 2001 1.0 1.0 1.0
    getSC 1954 1963 2001 1.0 0.9 1.0
    getSC 1954 1963 2001 1.0 0.8 1.0
    qui gen FC_lo = 1 - SC
    lab var FC_lo "FC (no post-2000 Misconduct) low est."
    getSC 1954 1963 2001 1.0 0.8 0.8
    qui gen FC7lo = 1 - SC
    lab var FC7lo "FC (post-2000 Misconduct) low est."
    getSC 1954 1963 2001 1.0 0.7 1.0
    getSC 1954 1963 2001 1.0 0.6 1.0
    getSC 1954 1963 2001 0.9 0.9 1.0
    getSC 1954 1963 2001 0.9 0.8 1.0
.
.  *****Wecker Change: replace 0.7 and 0.9with 1.0*****
.
.   *getSC 1954 1963 2001 0.9 0.7 1.0
.    getSC 1954 1963 2001 1.0 1.0 1.0
 15.
.  *************End Wecker Change***********
.
.   qui gen FC_ = 1 - SC
    lab var FC_ "FC (no post-2000 Misconduct) mid est."
    getSC 1954 1963 2001 0.9 0.7 0.7
    qui gen FC7 = 1 - SC
    lab var FC7 "FC (post-2000 Misconduct) mid est."
    getSC 1954 1963 2001 0.9 0.6 1.0
    getSC 1954 1963 2001 0.8 0.8 1.0
    getSC 1954 1963 2001 0.8 0.7 1.0
    getSC 1954 1963 2001 0.8 0.6 1.0
    qui gen FC_hi = 1 - SC
    lab var FC_hi "FC (no post-2000 Misconduct) high est."
    getSC 1954 1963 2001 0.8 0.6 0.6
    qui gen FC7hi = 1 - SC
    lab var FC7hi "FC (post-2000 Misconduct) high est."
 29.
 end

. rangeSC
```

T1	T2	T3	r1	r2	r3	deltaP	deltaX
1954	1963	2001	1.0	1.0	1.0	0.000	0.00
1954	1963	2001	1.0	0.9	1.0	0.022	-0.02
1954	1963	2001	1.0	0.8	1.0	0.046	-0.03
1954	1963	2001	1.0	0.8	0.8	0.046	0.00
1954	1963	2001	1.0	0.7	1.0	0.073	-0.01
1954	1963	2001	1.0	0.6	1.0	0.103	0.03
1954	1963	2001	0.9	0.9	1.0	0.030	-0.14
1954	1963	2001	0.9	0.8	1.0	0.055	-0.15
1954	1963	2001	1.0	1.0	1.0	0.000	0.00
1954	1963	2001	0.9	0.7	0.7	0.083	-0.09
1954	1963	2001	0.9	0.6	1.0	0.113	-0.10
1954	1963	2001	0.8	0.8	1.0	0.064	-0.28
1954	1963	2001	0.8	0.7	1.0	0.092	-0.27
1954	1963	2001	0.8	0.6	1.0	0.124	-0.23
1954	1963	2001	0.8	0.6	0.6	0.126	-0.15

```
. qui gen FB = 1 - SB

. * Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
. gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumula
> tive Proportion Who Have Begun to Smoke")saving(nir5a,replace)

. gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumul
> ative Proportion Who Have Begun to Smoke")saving(nir5b,replace)

. keep x F*

. form x %6.0f

. form F* %7.3f

. save nir5_r2_r1, replace
file nir5_r2_r1.dta saved

. * List data
. l,nod
```

	x	FC_lo	FC7lo	FC_	FC7	FC_hi	FC7hi	FB
1.	9	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.	10	0.022	0.022	0.022	0.021	0.019	0.019	0.022
3.	11	0.029	0.029	0.030	0.027	0.026	0.026	0.030
4.	12	0.040	0.040	0.041	0.038	0.036	0.036	0.041
5.	13	0.055	0.055	0.057	0.052	0.049	0.049	0.057
6.	14	0.080	0.080	0.083	0.075	0.070	0.070	0.083
7.	15	0.122	0.122	0.128	0.115	0.107	0.107	0.128
8.	16	0.186	0.186	0.196	0.174	0.162	0.162	0.196
9.	17	0.245	0.245	0.260	0.230	0.214	0.214	0.260
10.	18	0.326	0.326	0.347	0.305	0.284	0.284	0.347
11.	19	0.384	0.384	0.409	0.360	0.335	0.335	0.409
12.	20	0.454	0.454	0.485	0.427	0.397	0.397	0.485
13.	21	0.501	0.501	0.534	0.471	0.439	0.439	0.534
14.	22	0.529	0.529	0.565	0.498	0.465	0.465	0.565
15.	23	0.549	0.549	0.586	0.518	0.483	0.483	0.586
16.	24	0.568	0.568	0.605	0.535	0.499	0.499	0.605
17.	25	0.585	0.585	0.624	0.552	0.515	0.515	0.624
18.	26	0.600	0.600	0.640	0.566	0.529	0.529	0.640

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nir5.log

19.	27	0.614	0.614	0.654	0.579	0.541	0.541	0.654
20.	28	0.622	0.622	0.664	0.588	0.549	0.549	0.664
21.	29	0.629	0.629	0.671	0.594	0.555	0.555	0.671
22.	30	0.641	0.641	0.684	0.606	0.566	0.566	0.684
23.	31	0.648	0.648	0.691	[illegible]	[illegible]	[illegible]	[illegible]
24.	32	0.655	0.655	0.698	[illegible]	[illegible]	[illegible]	0.698
25.	33	0.662	0.662	0.705	[illegible]	0.585	[illegible]	[illegible]
26.	34	0.669	0.669	0.713	0.633	0.593	0.592	0.713
27.	35	0.675	0.675	0.720	0.639	0.598	0.598	0.720
28.	36	0.679	0.679	0.724	0.643	0.602	0.602	0.724
29.	37	0.682	0.682	0.727	0.645	0.604	0.604	0.727
30.	38	0.685	0.685	0.730	0.649	0.608	0.608	0.730
31.	39	0.687	0.687	0.732	0.651	0.609	0.609	0.732
32.	40	0.695	0.695	0.740	0.658	0.616	0.616	0.740
33.	41	0.697	0.697	0.743	0.660	0.619	0.619	0.743
34.	42	0.699	0.699	0.744	0.662	0.620	0.620	0.744
35.	43	0.700	0.700	0.746	0.663	0.621	0.621	0.746
36.	44	0.701	0.701	0.747	0.664	0.622	[illegible]	0.747
37.	45	0.704	0.704	0.750	0.667	0.625	[illegible]	0.750
38.	46	0.706	0.706	0.752	0.669	0.627	[illegible]	0.752
39.	47	0.708	0.707	0.754	0.670	0.629	[illegible]	0.754
40.	48	0.708	0.707	0.754	0.670	0.629	0.628	0.754
41.	49	0.709	0.709	0.755	0.672	0.630	0.629	0.755
42.	50	0.711	0.711	0.757	0.674	0.633	0.631	0.757


```
.
. * Compute changes in proportion who ever smoked
  global N = _N

. * Baseline scenario:
. di %9.3f FB[$N]
    0.757

. prog def Results
  1.  di "---        Decrease in proportion smoked      ---"
  2.  di "Post-2000        Low         Middle        High"
  3.  di "Misconduct       Est.        Est.          Est."
  4.  di " Yes     ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[
> $N] - FC7hi[$N]
  5.  di " No      ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[
> $N] - FC_hi[$N]
  6. end

. Results
---      Decrease in proportion smoked      ---
Post-2000        Low          Middle         High
Misconduct       Est.         Est.           Est.
 Yes            0.046         0.083          0.126
 No             0.046         0.000          0.124

.
. log close
```

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nir6_r2_r1.do

```
* @RM500
* nir6: BL-CF differences in proportion of ever-smokers and
* mean smoke-years exposure of claimants in HRA audit files
* Relative risk initiation model hC(t) = r1*hB(t) if year >= T1
* hC(t) = r2*hB(t) if year >= T2, where T2 >
* hC(t) = r3*hB(t) if year >= T3, where T3 >
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* T2 = max(T2,ylexp), T3 = max(T3,ylexp): Relative reduction r2 in
* initiation rate begins only after start of employment/exposure to asbestos

* Crossover insulators excluded
* Scenario      pre-88 misconduct    Estimate    r1     r2     r3
*    BL               -                  -       1.0    1.0    1.0
*    CF              yes                low      1.0    0.8    1.0
*    CF              yes                mid      0.9    0.7    1.0
*    CF              yes                high     0.8    0.6    1.0
*
* Input files: (nir) concatenated HR&A audit samples (from nir)

clear
prog drop _all
set imsg off
set more off
set matsize 200

log using nir6, replace
use "nir", clear

* (1) Save distribution of yrborn in Matrix pi(t)
* Exclude observations for which yrBegan was imputed in nir1.do
drop if iBegin == 0
* Exclude observations for which date of first exposure to asbestos unknown
drop if Ylexp == .
qui tab yrborn [w=w], matcell(pi) matrow(t_)
matrix pi = pi/_result(1)
matrix pi = t_, pi
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix drop t_
* Distribution of year of birth
matrix list pi

* Tabulate year first exposed to asbestos
tab Ylexp [w=w], missing
qui gen byte smk_exp = yrBegin < Ylexp
lab var smk_exp "Began smoking before 1st employment with asbestos
tab smk_exp [w=w]

* (2) Set up duration variable for initiation analysis
gen int ageEnd = ageBegin
replace ageEnd = yrDied - yrborn if ageEnd == .
replace ageEnd = yrSett - yrborn if ageEnd == .
replace ageEnd = yrRecv - yrborn if ageEnd == .
gen byte smoked = Smoker == 1

* (3) Compute initation survival curve
stset ageEnd [w=w], failure(Smoker) origin(time 0) scale(1) id(poc)
sts generate SB = s
form SB %9.3f
gen byte x = _t
lab var x "Age"
gen FB = 1 - SB
```

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```
form FB %9.3f
lab var FB "Cumul prop started smoking (BL)"
sort x
drop if x == x[_n-1]
global N = _N + 1
set obs $N
qui sum x
global xMin = r(min) - 1
replace x = $xMin in $N
replace FB = 0. in $N
replace SB = 1. in $N
sort x
form FB %9.0g
gr FB x if x<=50, xlab(10,15,20,25,30,35,40,45,50)ylab(0,.25,.5,.75,1)s(i)c(J)saving(nir3
a,replace)
form FB %9.3f
l x FB if x<=50

* (4) Computation of initiation rates in CF scenario
* Cutoff years for decrease in initiation rates are $T1 and max($T2,Ylexp)
* Relative decrease in initiation rate (on or after year T1) is global variable $r1
* Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global variable $r
2
* Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global variable $r
3

* SB(x) cumulative proportion not smoking through age x in BL scenario.
keep SB x Ylexp

sort x
order x SB
* Set xMax
* Age 50 set as cutoff for ever smoking
global xMax = 50
drop if x > $xMax
qui sum x
global xMin = r(min)
global N = _N

* Lifetime probability of not smoking by age $xMax in BL scenario
  global PB = SB[$N]
* Conditional survival curve in BL scenario
  qui gen SB_ = 1 - (1 - SB)/(1 - $PB)
  qui sum SB_
* Mean age started among those starting by age $xMax in BL scenario
  global XB = $xMin + r(mean)*$N
  di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
  di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
  drop SB_

* SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
qui gen SBr1 = .
qui gen SBr2 = .
qui gen SBr3 = .
gen SC = .

prog def getSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global r1 = $_4
  global r2 = $_5
  global r3 = $_6
```

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nir6_r2_r1.do

```
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }

* Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
  qui replace SBr1 = SB^$r1
  qui replace SBr2 = SB^$r2
  qui replace SBr3 = SB^$r3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(1-r1)*SB(min(x,T2-t))^(r1-r2)*SB(m
in(x,T3-t))^(r2-r3) for all x
* Sum over index `i' (rows of pi)
  local i = 1
  while `i' <= $m {
    local t = pi[`i',1]
    local p = pi[`i',2]
*   `x1' = age at T1
    local x1 = $T1 - `t'
*   `x2' = age at T2
*   local x2 = min($T2 - `t',$xMax)
*   `x2' = age at max(T2,Ylexp) (later of $T2 and year 1st exposed)
    local x2 = max($T2,Ylexp) - `t'
    local x2 = min(`x2', $xMax)

*   `x3' = age at T3
*   local x3 = min($T3 - `t',$xMax)
    local x3 = max($T3,Ylexp) - `t'
    local x3 = min(`x3', $xMax)

* Note: x3 >= x2 >= x1
*     `v1' = obs# at age at T1
      local u1 = `x1' - $xMin
      local v1 = `x1' - $xMin + 1
*     `v2' = obs# at age at T2
      local u2 = `x2' - $xMin
      local v2 = `x2' - $xMin + 1
*     `v3' = obs# at age at T3
      local u3 = `x3' - $xMin
      local v3 = `x3' - $xMin + 1
* Note: u3 >= u2 >= u1
      local A1 = SB[`u1']^(1-$r1)
      local A2 = SB[`u2']^($r1-$r2)
      local A3 = SB[`u3']^($r2-$r3)
* DEBUGGING
*     di "i= ",`i',"t= ",`t',"x1,x2,x3= ",`x1',`x2',`x3',"u1,u2,u3= ", `u1', `u2', `u3
',"v1,v2,v3= ", `v1', `v2', `v3'
*   Null Case:
    if `x1' >= $xMax {
* DEBUGGING
*     di "Null case"
      qui replace SC = SC + `p' * SB
    }
    else {
      if `u3' <= 0 {
* Case A: `u1' <= 0 & `u2' <= 0 & `u3' <= 0
* DEBUGGING
*     di "Case A"
        qui replace SC = SC + `p' * SBr3
      }
      else {
        if `u3' > 0 & `u2' <= 0 {
*     di "Case B"
* Case B: `u1' <= 0 & `u2' <= 0 & `u3' > 0
* DEBUGGING
          qui replace SC = SC + `p' * SBr2 in 1/`u3'
          if `v3' <= $N {
            qui replace SC = SC + `p' * SBr3 * `A3' in `v3'/$N
          }
        }
        else {
          if `u2' > 0 & `u1' <= 0 {
* Case C: `u1' <= 0 & `u2' > 0 & `u3' > 0
* DEBUGGING
*     di "Case C"
            qui replace SC = SC + `p' * SBr1 in 1/`u2'
            if `v2' <= `u3' {
              qui replace SC = SC + `p' * SBr2 * `A2' in `v2'/`u3'
            }
            if `v3' <= $N {
              qui replace SC = SC + `p' * SBr3 * `A2' * `A3' in `v3'/$N
            }
          }
          else {
* Case D: `u1' > 0 & `u2' > 0 & `u3' > 0
* DEBUGGING
*     di "Case D"
            qui replace SC = SC + `p' * SB in 1/`u1'
            qui replace SC = SC + `p' * SBr1 * `A1' in `v1'/`u2'
            if `v2' <= `u3' {
              qui replace SC = SC + `p' * SBr2 * `A1' * `A2' in `v2'/`u3'
            }
            if `v3' <= $N {
              qui replace SC = SC + `p' * SBr3 * `A1' * `A2' * `A3' in `v3'/$N
            }
          }
        }
      }
    }

    local i = `i' + 1
  }
* Lifetime probability of not smoking by age $xMax in CF scenario
  global PC = SC[$N]
* Conditional survival curve in CF scenario
  tempvar SC_
  qui gen `SC_' = 1 - (1 - SC)/(1 - $PC)
  qui sum `SC_'
* Mean age started among those starting by age $xMax in CF scenario
  global XC = $xMin + r(mean)*$N
  di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1, %7.1f $r2, %7.1f $r3, %7.3f $PC - $PB, %7
.2f $XB - $XC
end

prog def rangeSC
  di "      T1      T2      T3      r1      r2      r3   deltaP deltaX"
  getSC 1954 1963 2001 1.0 1.0 1.0
  getSC 1954 1963 2001 1.0 0.9 1.0
  getSC 1954 1963 2001 1.0 0.8 1.0
  qui gen FC_lo = 1 - SC
  lab var FC_lo "FC (no post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.8 0.8
  qui gen FC7lo = 1 - SC
  lab var FC7lo "FC (post-2000 Misconduct) low est."
  getSC 1954 1963 2001 1.0 0.7 1.0
  getSC 1954 1963 2001 1.0 0.6 1.0
  getSC 1954 1963 2001 0.9 0.9 1.0
  getSC 1954 1963 2001 0.9 0.8 1.0
```

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nir6_r2_r1.do

```
****Wecker Change: replace 0.7 and 0.9 with 1.0*******

  *getSC 1954 1963 2001 0.9 0.7 1.0
   getSC 1954 1963 2001 1.0 1.0 1.0

***********End Wecker Change***********

 qui gen FC_ = 1 - SC
 lab var FC_ "FC (no post-2000 Misconduct) mid est."
 getSC 1954 1963 2001 0.9 0.7 0.7
 qui gen FC7 = 1 - SC
 lab var FC7 "FC (post-2000 Misconduct) mid est."
 getSC 1954 1963 2001 0.9 0.6 1.0
 getSC 1954 1963 2001 0.8 0.8 1.0
 getSC 1954 1963 2001 0.8 0.7 1.0
 getSC 1954 1963 2001 0.8 0.6 1.0
 qui gen FC_hi = 1 - SC
 lab var FC_hi "FC (no post-2000 Misconduct) high est."
 getSC 1954 1963 2001 0.8 0.6 0.6
 qui gen FC7hi = 1 - SC
 lab var FC7hi "FC (post-2000 Misconduct) high est."

end

rangeSC

qui gen FB = 1 - SB
* Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumulative Propor
tion Who Have Begun to Smoke")saving(nir6a,replace)
gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumulative Propo
rtion Who Have Begun to Smoke")saving(nir6b,replace)
keep x F*
form x %6.0f
form F* %7.3f
save nir6_r2_r1, replace
* List data
l,nod

* Compute changes in proportion who ever smoked
global N = _N
* Baseline scenario:
di %9.3f FB[$N]
prog def Results
 di "---        Decrease in proportion smoked      ---"
 di "Post-2000                Low        Middle       High"
 di "Misconduct               Est.        Est.        Est."
 di " Yes     ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[$N] - FC7hi[$N
)
 di " No      ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[$N] - FC_hi[$N
]
end
Results

log close
\032
```


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nir6.log

```
. use "nir", clear

. * (1) Save distribution of yrborn in matrix pi(t)
. * Exclude observations for which yrBegan was imputed in nir[illegible]
. drop if iBegin == 0
(193 observations deleted)

. * Exclude observations for which date of first exposure to asbestos unknown
. drop if Ylexp == .
(47 observations deleted)

. qui tab yrborn [w=w], matcell(pi) matrow(t_)

. matrix pi = pi/_result(1)

. matrix pi = t_, pi

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix drop t_

. * Distribution of year of birth
. matrix list pi

pi[64,2]
```

	t	pi(t)
r1	1896	.00018528
r2	1897	.00014319
r3	1898	.0001936
r4	1900	.00063647
r5	1901	.00113331
r6	1902	.00016957
r7	1903	.00113415
r8	1904	.00063443
r9	1905	.00281819
r10	1906	.00332298
r11	1907	.00449854
r12	1908	.00365987
r13	1909	.00763218
r14	1910	.00601509
r15	1911	.00871055
r16	1912	.00815244
r17	1913	.0137759
r18	1914	.01685662
r19	1915	.01611698
r20	1916	.01891755
r21	1917	.02051612
r22	1918	.02706036
r23	1919	.02981462
r24	1920	.02726175
r25	1921	.03644682
r26	1922	.03416953
r27	1923	.03654592
r28	1924	.03229662
r29	1925	.04102194
r30	1926	.03281913
r31	1927	.0487059
r32	1928	.04231479
r33	1929	.02749656
r34	1930	.02990647
r35	1931	.02959857
r36	1932	[illegible]
r37	1933	[illegible]
r38	1934	[illegible]
r39	1935	[illegible]
r40	1936	[illegible]
r41	1937	.02655839
r42	1938	.02412411
r43	1939	.02616626
r44	1940	.02094601
r45	1941	.01744799
r46	1942	.02677041
r47	1943	.01544061
r48	1944	.01626907
r49	1945	.01590855
r50	1946	.01662858
r51	1947	[illegible]
r52	1948	[illegible]
r53	1949	[illegible]
r54	1950	[illegible]
r55	1951	.00809841
r56	1952	.00559396
r57	1953	.00404073
r58	1954	.00267647
r59	1955	.0015045
r60	1956	.00106411
r61	1957	.00056056
r62	1958	.00045207
r63	1959	.0008493
r64	1965	.00045207

```
.
. * Tabulate year first exposed to asbestos
. tab Ylexp [w=w], missing
(frequency weights assumed)
```

Year 1st Exposed to Asbestos	Freq.	Percent	Cum.
1912	986	0.00	0.00
1916	290	0.00	0.00
1920	40840	0.14	0.14
1921	3110	0.01	0.15
1922	19809	0.07	0.22
1923	56285	0.19	0.41
1924	8718	0.03	0.44
1925	36357	0.12	0.56
1926	23378	0.08	0.64
1927	19837	0.07	0.70
1928	42169	0.14	0.84
1929	39256	0.13	0.98
1930	34287	0.12	1.09
1931	57118	0.19	1.28
1932	34116	0.11	1.40
1933	101397	0.34	1.74
1934	109712	0.37	2.11
1935	198040	0.66	2.77
1936	271812	0.91	3.68
1937	323316	1.09	4.77
1938	264281	0.89	5.66
1939	421068	1.41	7.07
1940	999414	3.35	10.42
1941	1236684	4.15	14.57

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nir6.log

```
     1942 |    1283368       4.31      18.88
     1943 |    1198442       4.02      22.90
     1944 |     702165       2.36      25.26
     1945 |    1011878       3.40      28.65
     1946 |    1189366       3.99      [illegible]
     1947 |     976726       3.28      35.92
     1948 |    1080973       3.63      39.55
     1949 |     608863       2.04      41.59
     1950 |     889106       2.98      44.58
     1951 |    1196194       4.01      48.59
     1952 |    1257412       4.22      52.81
     1953 |     978193       3.28      56.09
     1954 |     500674       1.68      57.77
     1955 |     920743       3.09      60.86
     1956 |     661422       2.22      63.08
     1957 |     680420       2.28      65.37
     1958 |     822919       2.76      68.13
     1959 |     801776       2.69      70.82
     1960 |     617207       2.07      72.89
     1961 |     437519       1.47      74.36
     1962 |     668138       2.24      76.60
     1963 |     605962       2.03      78.63
     1964 |     928567       3.12      81.75
     1965 |    1013328       3.40      85.15
     1966 |     879274       2.95      88.10
     1967 |     542736       1.82      89.92
     1968 |     634357       2.13      92.05
     1969 |     524800       1.76      93.81
     1970 |     460072       1.54      95.36
     1971 |     294009       0.99      96.34
     1972 |     331490       1.11      97.46
     1973 |     275810       0.93      98.38
     1974 |     227880       0.76      99.15
     1975 |      68952       0.23      99.38
     1976 |      36228       0.12      99.50
     1977 |      29142       0.10      99.60
     1978 |       5640       0.02      99.62
     1979 |      45593       0.15      99.77
     1980 |      30175       0.10      99.87
     1985 |      13471       0.05      99.92
     1988 |      25308       0.08     100.00
------------+-----------------------------------
      Total |   29798568     100.00

. qui gen byte smk_exp = yrBegin < Ylexp

. lab var smk_exp "Began smoking before 1st employment with asbestos

. tab smk_exp [w=w]
(frequency weights assumed)

      Began |
    smoking |
  before 1st |
  employment |
       with |
   asbestos |      Freq.     Percent        Cum.
------------+-----------------------------------
          0 |   15219351       51.07       51.07
          1 |   14579217       48.93      100.00
------------+-----------------------------------
      Total |   29798568      100.00

.
. * (2) Set up duration variable for initiation analysis

. gen int ageEnd = ageBegin
(601 missing values generated)

. replace ageEnd = yrDied - yrborn if ageEnd == .
(0 real changes made)

. replace ageEnd = yrSeth - yrborn if ageEnd == .
(524 real changes made)

. replace ageEnd = yrRecv - yrborn if ageEnd == .
(77 real changes made)

. gen byte smoked = Smoker == 1

.
. * (3) Compute initation survival curve
. stset ageEnd [w=w], failure(Smoker) origin(time 0) scale(1) id(poc)
(frequency weights assumed)

                id:  poc
     failure event:  Smoker ~= 0 & Smoker ~= .
obs. time interval:  (ageEnd[_n-1], ageEnd]
 exit on or before:  failure
            weight:  [fweight=w]

------------------------------------------------------------------------------
     3881  total obs.
        0  exclusions
------------------------------------------------------------------------------
     3881  physical obs. remaining, equal to
 2.98e+07  weighted obs., representing
 2.98e+07  subjects
 2.28e+07  failures in single failure-per-subject data
 9.49e+08  total analysis time at risk, at risk from t =         0
                             earliest observed entry t =         0
                                  last observed exit t =        95

. sts generate SB = s

. form SB %9.3f

. gen byte x = _t

. lab var x "Age"

. gen FB = 1 - SB

. form FB %9.3f

. lab var FB "Cumul prop started smoking (BL)"

. sort x

. drop if x == x[_n-1]
(3796 observations deleted)

. global N = _N + 1

. set obs $N
obs was 85, now 86

. qui sum x

. global xMin = r(min) - 1
```

nir6.log

```
. replace x = $xMin in $N
(1 real change made)

. replace FB = 0. in $N
(1 real change made)

. replace SB = 1. in $N
(1 real change made)

. sort x

. form FB %9.0g

. gr FB x if x<=50, xlab(10,15,20,25,30,35,40,45,50)ylab(0,.25,.5,.75,1)s(i)c(J
> )saving(nit3a,replace)

. form FB %9.3f

. l x FB if x<=50

          x        FB
  1.      9     0.000
  2.     10     0.022
  3.     11     0.030
  4.     12     0.041
  5.     13     0.057
  6.     14     0.083
  7.     15     0.128
  8.     16     0.196
  9.     17     0.260
 10.     18     0.347
 11.     19     0.409
 12.     20     0.485
 13.     21     0.534
 14.     22     0.565
 15.     23     0.586
 16.     24     0.605
 17.     25     0.624
 18.     26     0.640
 19.     27     0.654
 20.     28     0.664
 21.     29     0.671
 22.     30     0.684
 23.     31     0.691
 24.     32     0.698
 25.     33     0.705
 26.     34     0.713
 27.     35     0.720
 28.     36     0.724
 29.     37     0.727
 30.     38     0.730
 31.     39     0.732
 32.     40     0.740
 33.     41     0.743
 34.     42     0.744
 35.     43     0.746
 36.     44     0.747
 37.     45     0.750
 38.     46     0.752
 39.     47     0.754
 40.     48     0.754
 41.     49     0.755
 42.     50     0.757
```

```
. * (4) Computation of initation rates in CF scenario
. * Cutoff years for decrease in initiation rates are $T1 and max($T2,Ylexp)
. * Relative decrease in initiation rate (on or after year T1) is global variab
> le $r1
. * Relative decrease in initiation rate (on or after max(T2,Ylexp) ) is global
> variable $r2
. * Relative decrease in initiation rate (on or after max(T3,Ylexp) ) is global
> variable $r3
.
. * SB(x) cumulative proportion not smoking through age x in BL scenario.
. keep SB x Ylexp

. sort x

. order x SB

. * Set xMax
. * Age 50 set as cutoff for ever smoking
. global xMax = 50

. drop if x > $xMax
(44 observations deleted)

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * Lifetime probability of not smoking by age $xMax in BL scenario
.   global PB = SB[$N]

. * Conditional survival curve in BL scenario
.   qui gen SB_ = 1 - (1 - SB)/(1 - $PB)

.   qui sum SB_

. * Mean age started among those starting by age $xMax in BL scenario
.   global XB = $xMin + r(mean)*$N

.   di "Probability of not smoking (by age $xMax) = ",%7.3f $PB
Probability of not smoking (by age 50) =    0.243

.   di "Mean age started (among those starting by age $xMax) = ",%7.1f $XB
Mean age started (among those starting by age 50) =     20.7

.   drop SB_

.
. * SBr3 = SB(x)^r3; SBr2 = SB(x)^r2; SBr1 = SB(x)^r1
. qui gen SBr1 = .

. qui gen SBr2 = .

. qui gen SBr3 = .

. gen SC = .
(42 missing values generated)

.
. prog def getSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = r1; $_5 = r2; $_6 = r3
```

nir6.log

```
.    global T1 = $_1
  2.    global T2 = $_2
  3.    global T3 = $_3
  4.    global r1 = $_4
  5.    global r2 = $_5
  6.    global r3 = $_6
  7. * Check T3 > T2 > T1
.    if $T2 <= $T1 | $T3 <= $T2 {
  8.      di "Invalid ",%9.0f $T1,$T2,$T3
  9.      exit
 10.      }
 11.
. * Compute SB(x)^r1 SB(x)^r2 SB(x)^r3
.    qui replace SBr1 = SB^$r1
 12.    qui replace SBr2 = SB^$r2
 13.    qui replace SBr3 = SB^$r3
 14.    qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*SB(x)^r2*SB(min(x,T1-t))^(r1-r2)*SB(min(x,T2-t
> ))^(r1-r2)*SB(min(x,T3-t))^(r2-r3) for all x
. * Sum over index 'i' (rows of pi)
.    local i = 1
 16.    while 'i' <= $m {
 17.       local t = pi['i',1]
 18.       local p = pi['i',2]
 19. *     'x1' = age at T1
.      local x1 = $T1 - 't'
 20. *     'x2' = age at T2
. *    local x2 = min($T2 - 't',$xMax)
. *    'x2' = age at max(T2,Ylexp) (later of $T2 and year 1st exposed)
.      local x2 = max($T2,Ylexp) - 't'
 21.       local x2 = min('x2', $xMax)
 22.
. *    'x3' = age at T3
. *    local x3 = min($T3 - 't',$xMax)
.      local x3 = max($T3,Ylexp) - 't'
 23.       local x3 = min('x3', $xMax)
 24.
. * Note: x3 >= x2 >= x1
. *       'v1' = obs# at age at T1
.         local u1 = 'x1' - $xMin
 25.           local v1 = 'x1' - $xMin + 1
 26. *         'v2' = obs# at age at T2
.         local u2 = 'x2' - $xMin
 27.           local v2 = 'x2' - $xMin + 1
 28. *         'v3' = obs# at age at T3
.         local u3 = 'x3' - $xMin
 29.           local v3 = 'x3' - $xMin + 1
 30. * Note: u3 >= u2 >= u1
.         local A1 = SB['u1']^(1-$r1)
 31.           local A2 = SB['u2']^($r1-$r2)
 32.           local A3 = SB['u3']^($r2-$r3)
 33. * DEBUGGING
. *       di "i= ",'i',"t= ",'t',"x1,x2,x3= ",'x1', 'x2', 'x3',"u1,u2,u3= ", 'u1'
> , 'u2', 'u3',"v1,v2,v3= ", 'v1', 'v2', 'v3'
. *     Null case:
.       if 'x1' >= $xMax {
 34. * DEBUGGING
. *       di "Null case"
.         qui replace SC = SC + 'p' * SB
 35.         }
 36.         else {
 37.           if 'u3' <= 0 {
 38. * Case A: 'u1' <= 0 & 'u2' <= 0 & 'u3' <= 0
. * DEBUGGING
. *       di "Case A"
.             qui replace SC = SC + 'p' * SBr3
 39.           }
 40.           else {
 41.             if 'u3' > 0 & 'u2' <= 0 {
 42. *           di "Case B"
. * Case B: 'u1' <= 0 & 'u2' <= 0 & 'u3' > 0
. * DEBUGGING
.               qui replace SC = SC + 'p' * SBr2 in 1/'u3'
 43.               if 'v3' <= $N {
 44.                 qui replace SC = SC + 'p' * SBr3 * 'A3' in 'v3'/$N
 45.                 }
 46.               }
 47.               else {
 48.                 if 'u2' > 0 & 'u1' <= 0 {
 49. * Case C: 'u1' <= 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
. *       di "Case C"
.                 qui replace SC = SC + 'p' * SBr1 in 1/'u2'
 50.                 if 'v2' <= 'u3' {
 51.                   qui replace SC = SC + 'p' * SBr2 * 'A2' in 'v2'/'u3'
 52.                   }
 53.                 if 'v3' <= $N {
 54.                   qui replace SC = SC + 'p' * SBr3 * 'A2' * 'A3' in 'v3'/$N
 55.                   }
 56.                 }
 57.                 else {
 58. * Case D: 'u1' > 0 & 'u2' > 0 & 'u3' > 0
. * DEBUGGING
. *       di "Case D"
.                   qui replace SC = SC + 'p' * SB in 1/'u1'
 59.                   qui replace SC = SC + 'p' * SBr1 * 'A1' in 'v1'/'u2'
 60.                   if 'v2' <= 'u3' {
 61.                     qui replace SC = SC + 'p' * SBr2 * 'A1' * 'A2' in 'v2'/'u3'
 62.                     }
 63.                   if 'v3' <= $N {
 64.                     qui replace SC = SC + 'p' * SBr3 * 'A1' * 'A2' * 'A3' in 'v3
> '/$N
 65.                     }
 66.                   }
 67.                 }
 68.               }
 69.             }
 70.
.       local i = 'i' + 1
 71.     }
 72. * Lifetime probability of not smoking by age $xMax in CF scenario
.    global PC = SC[$N]
 73   * Conditional survival curve in CF scenario
.    tempvar SC_
 74.    qui gen 'SC_' = 1 - (1 - SC)/(1 - $PC)
 75.    qui sum 'SC_'
 76. * Mean age started among those starting by age $xMax in CF scenario
.    global XC = $xMin + r(mean)*$N
 77.    di %7.0f $T1, %7.0f $T2,%7.0f $T3, %7.1f $r1; %7.1f $r2, %7.1f $r3, %7.3
> f $PC - $PB, %7.2f $XB - $XC
 78. end

.
. prog def rangeSC
  1.    di "      T1      T2      T3     r1      r2      r3   deltaP deltaX"
  2.    getSC 1954 1963 2001 1.0 1.0 1.0
  3.    getSC 1954 1963 2001 1.0 0.9 1.0
  4.    getSC 1954 1963 2001 1.0 0.8 1.0
  5.    qui gen FC_lo = 1 - SC
  6.    lab var FC_lo "FC (no post-2000 Misconduct) low est."
```

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```
  7.   getSC 1954 1963 2001 1.0 0.8 0.8
  8.   qui gen FC7lo = 1 - SC
  9.   lab var FC7lo "FC (post-2000 Misconduct) low est."
 10.   getSC 1954 1963 2001 1.0 0.7 1.0
 11.   getSC 1954 1963 2001 1.0 0.6 1.0
 12.   getSC 1954 1963 2001 0.9 0.9 1.0
 13.   getSC 1954 1963 2001 0.9 0.8 1.0
 14.
  ****Wecker Change: replace 0.7 and 0.9 with 1.0*******

   *getSC 1954 1963 2001 0.9 0.7 1.0
    getSC 1954 1963 2001 1.0 1.0 1.0
 15.
  ************End Wecker Change************
.  qui gen FC_ = 1 - SC
 16.   lab var FC_ "FC (no post-2000 Misconduct) mid est."
 17.   getSC 1954 1963 2001 0.9 0.7 0.7
 18.   qui gen FC7 = 1 - SC
 19.   lab var FC7 "FC (post-2000 Misconduct) mid est."
 20.   getSC 1954 1963 2001 0.9 0.6 1.0
 21.   getSC 1954 1963 2001 0.8 0.8 1.0
 22.   getSC 1954 1963 2001 0.8 0.7 1.0
 23.   getSC 1954 1963 2001 0.8 0.6 1.0
 24.   qui gen FC_hi = 1 - SC
 25.   lab var FC_hi "FC (no post-2000 Misconduct) high est."
 26.   getSC 1954 1963 2001 0.8 0.6 0.6
 27.   qui gen FC7hi = 1 - SC
 28.   lab var FC7hi "FC (post-2000 Misconduct) high est."
 29.
. end
```

general asbestos specific

remove asbestos specific and general misticlassification rate effect (part)

```
. rangeSC
```

T1	T2	T3	r1	r2	r3	deltaP	deltaX
1954	1963	2001	1.0	1.0	1.0	0.000	0.00
1954	1963	2001	1.0	0.9	1.0	0.008	0.06
1954	1963	2001	1.0	0.8	1.0	0.017	0.13
1954	1963	2001	1.0	0.8	0.8	0.018	0.15
1954	1963	2001	1.0	0.7	1.0	0.027	0.21
1954	1963	2001	1.0	0.6	1.0	0.037	0.30
1954	1963	2001	0.9	0.9	1.0	0.016	0.03
1954	1963	2001	0.9	0.8	1.0	0.025	0.10
1954	1963	2001	1.0	1.0	1.0	0.000	0.00
1954	1963	2001	0.9	0.7	0.7	0.036	0.21
1954	1963	2001	0.9	0.6	1.0	0.046	0.28
1954	1963	2001	0.8	0.8	1.0	0.034	0.07
1954	1963	2001	0.8	0.7	1.0	0.045	0.15
1954	1963	2001	0.8	0.6	1.0	0.056	0.25
1954	1963	2001	0.8	0.6	0.6	0.057	0.30

```
. qui gen FB = 1 - SB

. * Graph results for T1,T2 = 1954,1963 r1,r2 = 0.9,0.6 vs. T2 = 1988, r2 = 0.6
. gr FC_* FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iiii)c(JJJJ)l1("Cumula
> tive Proportion Who Have Begun to Smoke")saving(nir6a,replace)
(Note: file nir6a.gph not found)

. gr FC_ FC7 FB x,ylab(0,.25,.5,.75,1)xlab(10,20,30,40,50)s(iii)c(JJJ)l1("Cumul
> ative Proportion Who Have Begun to Smoke")saving(nir6b,replace)
(Note: file nir6b.gph not found)

. keep x F*

. form x %6.0f

. form F* %7.3f

. save nir6_r2_r1, replace
note: file nir6_r2_r1.dta not found
file nir6_r2_r1.dta saved

. * List data
. l,nod
```

produced by RJRTC in HUMPHREY

	x	FC_lo	FC7lo	FC_	FC7	FC_hi	FC7hi	FB
1.	9	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.	10	0.022	0.022	0.022	0.022	0.022	0.022	0.022
3.	11	0.030	0.030	0.030	0.029	0.029	0.029	0.030
4.	12	0.041	0.041	0.041	0.041	0.040	0.040	0.041
5.	13	0.056	0.056	0.057	0.056	0.055	0.055	0.057
6.	[illegible]	[illegible]	0.082	0.083	0.081	0.080	0.080	0.083
7.	[illegible]	0.128	0.128	0.128	0.125	0.123	0.123	0.128
8.	[illegible]	0.195	0.195	0.196	0.191	0.187	0.187	0.196
9.	[illegible]	[illegible]	[illegible]	0.260	0.252	0.247	0.247	0.260
10.	18	0.343	0.343	0.347	0.336	0.328	0.328	0.347
11.	19	0.404	0.404	0.409	0.396	0.387	0.387	0.409
12.	20	0.478	0.478	0.485	0.468	0.457	0.457	0.485
13.	21	0.527	0.527	0.534	0.516	0.504	0.504	0.534
14.	22	0.557	0.557	0.565	0.545	0.532	0.532	0.565
15.	23	0.577	0.577	0.586	0.565	0.552	0.552	0.586
16.	24	0.596	0.596	0.605	0.584	0.570	0.570	0.605
17.	25	0.615	0.615	0.624	0.601	0.587	0.587	0.624
18.	26	0.630	0.630	0.640	0.616	0.601	0.601	0.640
19.	27	0.644	0.644	0.654	0.630	0.614	0.614	0.654
20.	28	0.653	0.653	0.664	0.638	0.622	0.622	0.664
21.	29	0.659	0.659	0.671	0.645	0.629	0.629	0.671
22.	30	0.672	0.672	0.684	0.657	0.640	0.640	0.684
23.	31	0.679	0.679	0.691	0.663	0.646	0.646	0.691
24.	32	0.686	0.686	0.698	0.670	0.653	0.653	0.698
25.	33	0.692	0.692	0.705	0.676	0.659	0.659	0.705
26.	34	0.700	0.700	0.713	0.684	0.665	0.665	0.713
27.	35	0.706	0.706	0.720	0.689	0.671	0.671	0.720
28.	36	0.710	0.710	0.724	0.693	0.674	0.674	0.724
29.	37	0.712	0.712	0.727	0.695	0.676	0.676	0.727
30.	38	0.716	0.716	0.730	0.699	0.679	0.679	0.730
31.	39	0.717	0.717	0.732	0.700	0.681	0.681	0.732
32.	40	0.725	0.725	0.740	0.707	0.687	0.687	0.740
33.	41	0.727	0.727	0.743	0.709	0.689	0.689	0.743
34.	42	0.728	0.728	0.744	0.710	0.690	0.690	0.744
35.	43	0.729	0.729	0.746	0.711	0.691	0.691	0.746
36.	44	0.731	0.731	0.747	0.712	0.692	0.692	0.747
37.	45	0.734	0.733	0.750	0.715	0.695	0.695	0.750
38.	46	0.735	0.735	0.752	0.717	0.696	0.696	0.752
39.	47	0.736	0.736	0.754	0.718	0.697	0.697	0.754
40.	48	0.736	0.736	0.754	0.718	0.697	0.697	0.754
41.	49	0.738	0.738	0.755	0.719	0.698	0.698	0.755
42.	50	0.740	0.739	0.757	0.721	0.701	0.700	0.757

```
. * Compute changes in proportion who ever smoked
. global N = _N

. * Baseline scenario:
. di %9.3f FB[$N]
    0.757

. prog def Results
  1.  di "---      Decrease in proportion smoked     ---"
```

nir6.log

```
  2.  di "Post-2000         Low        Middle        High"
  3.  di "Misconduct        Est.        Est.          Est."
  4.  di " Yes     ",%12.3f FB[$N] - FC7lo[$N],%12.3f FB[$N] - FC7[$N],%12.3f FB[
> $N] - FC7hi[$N]
  5.  di " No      ",%12.3f FB[$N] - FC_lo[$N],%12.3f FB[$N] - FC_[$N],%12.3f FB[
> $N] - FC_hi[$N]
  6. end

. Results
---      Decrease in proportion smoked     ---
Post-2000          Low          Middle         High
Misconduct         Est.         Est.           Est.
 Yes              0.018        0.036          0.057
 No               0.017        0.000          0.056

.
. log close
```


16

nqr7_R2_R1.do

```
* @RM500
* nqr7: BL-CF differences in mean smoke-years exposure
* based upon empirical smoke-survival curve and mortality
* of claimants in HRA audit files (excluding Insulator crossovers)
* Relative risk quitting model hC(t) = R1*hB(t) if T2 > year >= T1
* hC(t) = R2*hB(t) if T3 > year >= T2, where T2 > T1
* hC(t) = R3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1: T3 can be any value, not just 1999)
* Projection to future claimants based upon birth-year distribution pi()
* derived from age9.dta and distribution of ever-smokers by birth cohort
* from nir.dta

clear
prog drop _all
set matsize 400
set rmsg off
set more off

log using nqr7, replace

* cutoff years for changes in quit rates are global variables $T1, $T2, $T3
* Relative increase in quit rate (on or after year T1) is global variable $R1
* Relative increase in quit rate (on or after year T2) is global variable $R2
* Relative increase in quit rate (on or after year T3) is global variable $R3
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)

* (1a) get distribution of birth year of all future claimants from age9.dta
use "age9"
keep year AllFutur
mkmat year AllFutur
matrix pi = year,AllFutur
matrix drop year AllFutur
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix list pi
drop _all

* (1b) Compute ever-smoking prevalence by birth cohort from nir.dta
* Note: 'nir.dta' excludes Insulator crossovers
drop _all
use "nir"
keep coh Smok w
tab coh [w=w], sum(Smok)

* Matrix E holds ever-smoking prevalence by cohort
matrix E = (1880, 1909 \ 1910, 1919 \ 1920, 1929 \ 1930, 1939 \ 1940, 1971 )
matrix E = E, J(5,1,0)
matrix colnames E = t0 t1 Ever

prog def setE
  local i = 1
  while 'i' <= 5 {
    qui sum Smok [w=w] if coh == 'i'
    matrix E['i',3] = r(mean)
    local i = 'i' + 1
  }
end
setE
matrix li E

* (1c) Compute conditional distribn of birth year pi() among ever smokers
```

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```
drop _all
svmat pi
ren pi1 t
ren pi2 pi
qui gen pi_ = .
form pi %9.4f

prog def getpi
 local i = 1
 while 'i' <= 5 {
   replace pi_ = pi*E['i',3] if t >= E['i',1] & t <= E['i',2]
*   Note:  In CF with pre-1988 misconduct, ever-smoking prevalence
*   of 1940+ birth cohort will be reduced by 3.6%. (nir4.log).
*    But this feedback effect is very small.
   local i = 'i' + 1
 }
 qui sum pi_
 global sumPi = r(mean)*r(N)
 qui replace pi_ = pi_/$sumPi
end
getpi

* Replace pi_ in 2nd col of matrix pi()
mkmat pi_
matrix pi = pi[1..$m,1..1]
matrix pi = pi,pi_


* (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

drop _all
* Get L and SB from nqr4 output
use "nqr4"qui sum x
global xMin = r(min)
global N = _N

* LSB is proportion who are still smoking and alive
gen LSB = L*SB
qui sum LSB
* EB is mean smoke-years taking mortality into account
global EB = r(mean)*$N
di "Mean smoke-years (BL) = ",%9.2f $EB
* LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
gen LSBR1 = .
gen LSBR2 = .
gen LSBR3 = .
gen SC = .

prog def LSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global R1 = $_4
  global R2 = $_5
  global R3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
    }
* Compute SB(x)^R1 and L(x)*SB(x)^R1
* Compute SB(x)^R2 and L(x)*SB(x)^R2
* Compute SB(x)^R3 and L(x)*SB(x)^R3
```

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nqr7_R2_R1.do

```
qui replace LSBR1 = L*SB^$R1
qui replace LSBR2 = L*SB^$R2
qui replace LSBR3 = L*SB^$R3
qui replace SC = 0
* Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
* SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
* Sum over index `i' (rows of pi)
local i = 1
while `i' <= $m {
  local t = pi[`i',1]
*  `t' year of birth
  local u1 = $T1 - `t' - $xMin - 1
  local v1 = `u1' + 1
  local u2 = $T2 - `t' - $xMin - 1
  local v2 = `u2' + 1
  local u3 = min($T3 - `t' - $xMin - 1,$N)
  local v3 = `u3' + 1
*  Compute intermediate `areas'
  local A1 = SB[`u1']^(1-$R1)
  local A2 = SB[`u2']^($R1-$R2)
  local A3 = SB[`u3']^($R2-$R3)
*  `u3' > `u2' > `u1' required
*  Case A:
  if `u3' <= 0 {
    qui replace SC = SC + pi[`i',2] * LSBR3
  }
  else {
*  Case B:
    if `u3' > 0 & `u2' <= 0 {
      qui replace SC = SC + pi[`i',2] * LSBR2 in 1/`u3'
      if `v3' <= $N {
        qui replace SC = SC + pi[`i',2] * LSBR3 * `A3' in `v3'/$N
      }
    }
    else {
*  Case C:
      if `u2' > 0 & `u1' <= 0 {
        qui replace SC = SC + pi[`i',2] * LSBR1 in 1/`u2'
        qui replace SC = SC + pi[`i',2] * LSBR2 * `A2' in `v2'/`u3'
        if `v3' <= $N {
          qui replace SC = SC + pi[`i',2] * LSBR3 * `A2' * `A3' in `v3'/$N
        }
      }
      else {
*  Case D:
        qui replace SC = SC + pi[`i',2] * LSB in 1/`u1'
        qui replace SC = SC + pi[`i',2] * LSBR1 * `A1' in `v1'/`u2'
        qui replace SC = SC + pi[`i',2] * LSBR2 * `A1' * `A2' in `v2'/`u3'
        if `v3' <= $N {
          qui replace SC = SC + pi[`i',2] * LSBR3 * `A1' * `A2' * `A3' in `v3'/$N
        }
      }
    }
  }
  local i = `i' + 1
}
qui sum SC
global EC = r(mean)*$N
di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB,%8.2f $EC,%8.
2f $EB - $EC
end

prog def rangeSC
  di "        T1       T2       T3       R1       R2       R3       XB       XC    deltaX"
```

```
LSC 1954 1963 2001 1.0 2.1 1.0
qui gen SC_lo = SC
lab var SC_lo "SC (R=1 post-2000) low est."
LSC 1954 1963 2001 1.0 2.4 2.4
LSC 1954 1963 2001 1.0 2.4 1.0
LSC 1954 1963 2001 1.0 3.0 1.0
LSC 1954 1963 2001 1.0 3.6 1.0

LSC 1954 1963 2001 1.5 2.4 1.0

******Wecker Change: change 3.0 and 1.5 to 1.0******

*LSC 1954 1963 2001 1.5 3.0 1.0
 LSC 1954 1963 2001 1.0 1.0 1.0

**************End Wecker Change************

qui gen SC_ = SC
lab var SC_ "SC (R=1 post-2000) middle est."
LSC 1954 1963 2001 1.5 3.0 3.0
qui gen SC3 = SC
lab var SC3 "SC (R=3 post-2000) middle est."

LSC 1954 1963 2001 1.5 3.6 1.0
LSC 1954 1963 2001 2.0 2.4 1.0
LSC 1954 1963 2001 2.0 3.0 1.0
LSC 1954 1963 2001 2.0 3.6 1.0
LSC 1954 1963 2001 2.0 3.9 1.0
qui gen SC_hi = SC
lab var SC_hi "SC (R=1 post-2000) high est."
LSC 1954 1963 2001 2.0 3.9 3.9

LSC 1954 1963 1999 1.5 3.0 1.0
LSC 1954 1963 2000 1.5 3.0 1.0


end

rangeSC

gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1("Proportion
 Still Alive and Smoking")saving(nqr7a,replace)
gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(JJJ)l1("Prop
ortion Still Alive and Smoking")saving(nqr7b,replace)

form LSB SC* %7.3f
form x %6.0f
keep x LSB SC_*
l, nod
save nqr7_R2_R1, replace

log close

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```


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nqr7.log

```
.
. * Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
. * Relative increase in quit rate (on or after year T1) is global variable $R1
. * Relative increase in quit rate (on or after year T2) is global variable $R2
. * Relative increase in quit rate (on or after year T3) is global variable $R3
. * (R3 can be any value, not just 1; T3 can be any value, not just 1990)
.
. * (1a) get distribution of birth year of all future claimants from age9.dta
. use "age9"

. keep year AllFutur

. mkmat year AllFutur

. matrix pi = year,AllFutur

. matrix drop year AllFutur

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix list pi
```

pi[72,2]

	t	pi(t)
r1	1900	.00004113
r2	1901	.00002101
r3	1902	.00003102
r4	1903	.00004538
r5	1904	.00006578
r6	1905	.00009443
r7	1906	.00013421
r8	1907	.0001888
r9	1908	.00026279
r10	1909	.00036178
r11	1910	.00049251
r12	1911	.00066282
r13	1912	.00088162
r14	1913	.00115874
r15	1914	.00150459
r16	1915	.00192976
r17	1916	.00244442
r18	1917	.00305756
r19	1918	.00377616
r20	1919	.00460425
r21	1920	.00554198
r22	1921	.00658479
r23	1922	.00772278
r24	1923	.00894043
r25	1924	.01021674
r26	1925	.01152602
r27	1926	.01283937
r28	1927	.01412696
r29	1928	.0153611
r30	1929	.01652004
r31	1930	.0175923
r32	1931	.01858097
r33	1932	.01950742
r34	1933	.02041352
r35	1934	.02136119
r36	1935	.02242851
r37	1936	.02370143
r38	1937	.02526133
r39	1938	.02716919
[illegible]	1939	[illegible]
[illegible]	1940	[illegible]
[illegible]	1941	[illegible]
[illegible]	1942	[illegible]
r44	1943	.04074331
r45	1944	.04321814
r46	1945	.04507414
r47	1946	.04608816
[illegible]	1947	.04609812
[illegible]	1948	.0450277
[illegible]	1949	.04289862
r51	1950	.03982827
r52	1951	.03601309
r53	1952	.03170149
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
r56	[illegible]	[illegible]
r57	[illegible]	[illegible]
r58	1957	.01117046
r59	1958	.00837034
r60	1959	.00611337
r61	1960	.00435552
r62	1961	.00303046
r63	1962	.00206233
r64	1963	.00137566
r65	1964	.00090207
r66	1965	.00058381
r67	1966	.00037486
r68	1967	.0002404
r69	1968	.00015518
r70	1969	.00010166
r71	1970	.0000681
r72	1971	.00017831

```
. drop _all

.
.
. * (1b) Compute ever-smoking prevalence by birth cohort from nir.dta
. * Note: 'nir.dta' excludes Insulator crossovers
. drop _all

. use "nir"

. keep coh Smok w

. tab coh [w=w], sum(Smok)
(analytic weights assumed)
```

	Summary of Smoked?			
cohort	Mean	Std. Dev.	Freq.	Obs.
-1909	.65828276	.47546956	846463	201
1910-19	.78556302	.41063019	5166357	1032
1920-29	.79826907	.40141712	11307582	1609
1930-39	.75219631	.43200298	7859782	813
1940-	.7517905	.43243825	5989541	466
Total	.77181249	.41971504	31169725	4121

```
.
. * Matrix E holds ever-smoking prevalence by cohort
```

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nqr7.log

```
. matrix E = (1880, 1909 \ 1910, 1919 \ 1920, 1929 \ 1930, 1939 \ 1940, 1971 )

. matrix E = E, J(5,1,0)

. matrix colnames E = t0 t1 Ever

.
. prog def setE
  1.    local i = 1
  2.    while `i' <= 5 {
  3.       qui sum Smok [w=w] if coh == `i'
  4.       matrix E[`i',3] = r(mean)
  5.       local i = `i' + 1
  6.    }
  7. end

. setE

. matrix li E

E[5,3]
           t0          t1        Ever
r1       1880        1909   .65828276
r2       1910        1919   .78556302
r3       1920        1929   .79826907
r4       1930        1939   .75219631
r5       1940        1971    .7517905

.
. * (1c) Compute conditional distribn of birth year pi() among ever smokers
.
. drop _all

. svmat pi
number of observations will be reset to 72
Press any key to continue, or Break to abort
obs was 0, now 72

. ren pi1 t

. ren pi2 pi

. qui gen pi_ = .

. form pi* %9.4f

.
. prog def getpi
  1.  local i = 1
  2.  while `i' <= 5 {
  3.     replace pi_ = pi*E[`i',3] if t >= E[`i',1] & t <= E[`i',2]
  4. *     Note:  In CF with pre-1988 misconduct, ever-smoking prevalence
. *    of 1940+ birth cohort will be reduced by 3.6%. (nir4.log).
. *    But this feedback effect is very small.
.     local i = `i' + 1
  5.  }
  6.  qui sum pi_
  7.  global sumPi = r(mean)*r(N)
  8.  qui replace pi_ = pi_/$sumPi
  9. end

. getpi
(10 real changes made)
(10 real changes made)
(10 real changes made)
(10 real changes made)
(32 real changes made)

. * Replace pi_ 2nd col of matrix pi()
. mkmat pi_

. matrix pi = pi[1..$m,1..1]

. matrix pi = pi,pi_

.
. * (2) Compute Mean Years Smoked Among Persons Who Ever Smoked
.
. drop _all

. * Get L and SB from nqr6 output
. use "nqr4"

. qui sum x

. global xMin = r(min)

. global N = _N

.
. * LSB is proportion who are still smoking and alive
. gen LSB = L*SB

. qui sum LSB

. * EB is mean smoke-years taking mortality into account
. global EB = r(mean)*$N

. di "Mean smoke-years (BL) = ",%9.2f $EB
Mean smoke-years (BL) =      45.43

. * LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
. gen LSBR1 = .
(82 missing values generated)

. gen LSBR2 = .
(82 missing values generated)

. gen LSBR3 = .
(82 missing values generated)

. gen SC = .
(82 missing values generated)

.
. prog def LSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
.   global T1 = $_1
  2.    global T2 = $_2
  3.    global T3 = $_3
  4.    global R1 = $_4
  5.    global R2 = $_5
  6.    global R3 = $_6
  7. * Check T3 > T2 > T1
.   if $T2 <= $T1 | $T3 <= $T2 {
  8.     di "Invalid ",%9.0f $T1,$T2,$T3
  9.     exit
 10.    }
```

nqr7.log


```
 11. * Compute SB(x)^R1 and L(x)*SB(x)^R1
 . * Compute SB(x)^R2 and L(x)*SB(x)^R2
 . * Compute SB(x)^R3 and L(x)*SB(x)^R3
 .   qui replace LSBR1 = L*SB^$R1
 12.   qui replace LSBR2 = L*SB^$R2
 13.   qui replace LSBR3 = L*SB^$R3
 14.   qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
 . * SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
 . * Sum over index 'i' (rows of pi)
 .   local i = 1
 16.   while 'i' <= $m {
 17.     local t = pi['i',1]
 18. *   't' year of birth
 .     local u1 = $T1 - 't' - $xMin - 1
 19.     local v1 = 'u1' + 1
 20.     local u2 = $T2 - 't' - $xMin - 1
 21.     local v2 = 'u2' + 1
 22.     local u3 = min($T3 - 't' - $xMin - 1,$N)
 23.     local v3 = 'u3' + 1
 24. *   Compute intermediate 'areas'
 .     local A1 = SB['u1']^(1-$R1)
 25.     local A2 = SB['u2']^($R1-$R2)
 26.     local A3 = SB['u3']^($R2-$R3)
 27. *   'u3' > 'u2' > 'u1' required
 . *   Case A:
 .     if 'u3' <= 0 {
 28.       qui replace SC = SC + pi['i',2] * LSBR3
 29.     }
 30.     else {
 31. *   Case B:
 .       if 'u3' > 0 & 'u2' <= 0 {
 32.         qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
 33.         if 'v3' <= $N {
 34.           qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
 35.         }
 36.       }
 37.       else {
 38. *     Case C:
 .         if 'u2' > 0 & 'u1' <= 0 {
 39.           qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
 40.           qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
 41.           if 'v3' <= $N {
 42.             qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/
> $N
 43.           }
 44.         }
 45.         else {
 46. *       Case D:
 .           qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
 47.           qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
 48.           qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u
> 3'
 49.           if 'v3' <= $N {
 50.             qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' i
> n 'v3'/$N
 51.           }
 52.         }
 53.       }
 54.     }
 55.     local i = 'i' + 1
 56.   }
 57.   qui sum SC
 58.   global EC = r(mean)*$N
 59.   di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB
> ,%8.2f $EC,%8.2f $EB - $EC
 60. end

. prog def rangeSC
 1. di "  T1  T2  T3  R1  R2  R3  XB  XC
> deltaX"
 2.
 .   LSC 1954 1963 2001 1.0 2.1 1.0
 3.   qui gen SC_lo = SC
 4.   lab var SC_lo "SC (R=1 post-2000) low est."
 5.   LSC 1954 1963 2001 1.0 2.1 2.1
 6.   LSC 1954 1963 2001 1.0 2.4 1.0
 7.   LSC 1954 1963 2001 1.0 3.0 1.0
 8.   LSC 1954 1963 2001 1.0 3.6 1.0
 9.
 .   LSC 1954 1963 2001 1.5 2.4 1.0
 10.
 . *****Wecker Change: change 3.0 and 1.5 to 1.0******
 .   *LSC 1954 1963 2001 1.5 3.0 1.0
 .   LSC 1954 1963 2001 1.0 1.0 1.0
 11.
 .   **************End Wecker Change************
 .
 .   qui gen SC_ = SC
 12.   lab var SC_ "SC (R=1 post-2000) middle est."
 13.   LSC 1954 1963 2001 1.5 3.0 3.0
 14.   qui gen SC3 = SC
 15.   lab var SC3 "SC (R=3 post-2000) middle est."
 16.
 .   LSC 1954 1963 2001 1.5 3.6 1.0
 17.   LSC 1954 1963 2001 2.0 2.4 1.0
 18.   LSC 1954 1963 2001 2.0 3.0 1.0
 19.   LSC 1954 1963 2001 2.0 3.6 1.0
 20.   LSC 1954 1963 2001 2.0 3.9 1.0
 21.   qui gen SC_hi = SC
 22.   lab var SC_hi "SC (R=1 post-2000) high est."
 23.   LSC 1954 1963 2001 2.0 3.9 3.9
 24.
 .   LSC 1954 1963 1999 1.5 3.0 1.0
 25.   LSC 1954 1963 2000 1.5 3.0 1.0
 26.
 .
 . end

 .
 . rangeSC
```

T1	T2	T3	R1	R2	R3	XB	XC	deltaX
1954	1963	2001	1.0	2.1	1.0	45.43	37.06	8.37
1954	1963	2001	1.0	2.1	2.1	45.43	34.47	10.96
1954	1963	2001	1.0	2.4	1.0	45.43	35.34	10.09
1954	1963	2001	1.0	3.0	1.0	45.43	32.42	13.01
1954	1963	2001	1.0	3.6	1.0	45.43	30.03	15.40
1954	1963	2001	1.5	2.4	1.0	45.43	35.12	10.31
1954	1963	2001	1.0	1.0	1.0	45.43	45.43	0.00
1954	1963	2001	1.5	3.0	3.0	45.43	29.53	15.90
1954	1963	2001	1.5	3.6	1.0	45.43	29.85	15.58
1954	1963	2001	2.0	2.4	1.0	45.43	34.90	10.52
1954	1963	2001	2.0	3.0	1.0	45.43	32.03	13.40
1954	1963	2001	2.0	3.6	1.0	45.43	29.68	15.75
1954	1963	2001	2.0	3.9	1.0	45.43	28.65	16.77
1954	1963	2001	2.0	3.9	3.9	45.43	26.30	19.13
1954	1963	1999	1.5	3.0	1.0	45.43	32.75	12.68

nqr7.log

```
  1954    1963    2000     1.5     3.0     1.0   45.43   32.48   12.95

.
. gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1
> ("Proportion Still Alive and Smoking")saving(nqr7a,replace)
(Note: file nqr7a.gph not found)

. gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(
> JJJ)l1("Proportion Still Alive and Smoking")saving(nqr7b,replace)
(Note: file nqr7b.gph not found)

.
. form LSB SC* %7.3f

. form x %6.0f

. keep x LSB SC*

. l, nod
```

	x	LSB	SC_lo	SC_	SC_hi
1.	17	1.000	1.000	1.000	1.000
2.	18	1.000	1.000	1.000	1.000
3.	19	0.999	0.998	0.999	0.996
4.	20	0.994	0.990	0.994	0.983
5.	21	0.990	0.984	0.990	0.972
6.	22	0.977	0.962	0.977	0.933
7.	23	0.973	0.956	0.973	0.922
8.	24	0.967	0.945	0.967	0.903
9.	25	0.963	0.937	0.963	0.890
10.	26	0.959	0.930	0.959	0.879
11.	27	0.954	0.922	0.954	0.865
12.	28	0.951	0.917	0.951	0.856
13.	29	0.946	0.908	0.946	0.841
14.	30	0.939	0.895	0.939	0.818
15.	31	0.934	0.886	0.934	0.803
16.	32	0.925	0.869	0.925	0.776
17.	33	0.922	0.863	0.922	0.765
18.	34	0.910	0.842	0.910	0.731
19.	35	0.900	0.823	0.900	0.701
20.	36	0.895	0.814	0.895	0.688
21.	37	0.891	0.806	0.891	0.675
22.	38	0.883	0.792	0.883	0.654
23.	39	0.873	0.773	0.873	0.625
24.	40	0.859	0.749	0.859	0.590
25.	41	0.852	0.736	0.852	0.571
26.	42	0.835	0.708	0.835	0.531
27.	43	0.822	0.685	0.822	0.500
28.	44	0.810	0.665	0.810	0.475
29.	45	0.791	0.634	0.791	0.435
30.	46	0.776	0.611	0.776	0.407
31.	47	0.760	0.587	0.760	0.379
32.	48	0.742	0.560	0.742	0.349
33.	49	0.730	0.544	0.730	0.332
34.	50	0.706	0.512	0.706	0.299
35.	51	0.695	0.499	0.695	0.287
36.	52	0.678	0.479	0.678	0.268
37.	53	0.659	0.457	0.659	0.250
38.	54	0.642	0.437	0.642	0.233
39.	55	0.618	0.413	0.618	0.214
40.	56	0.596	0.392	0.596	0.199
41.	57	0.573	0.370	0.573	0.184
42.	58	0.559	0.357	0.559	0.175
43.	59	0.536	0.338	0.536	0.163
44.	60	0.510	0.317	0.510	0.151
45.	61	0.492	0.303	0.492	0.143
46.	62	0.473	0.288	0.473	0.135
47.	63	0.448	0.269	0.448	0.125
48.	64	[illegible]	[illegible]	[illegible]	0.118
49.	65	[illegible]	[illegible]	0.411	0.112
50.	66	[illegible]	[illegible]	[illegible]	0.105
51.	67	[illegible]	[illegible]	[illegible]	0.100
52.	68	0.355	0.207	0.355	0.095
53.	69	0.335	0.194	0.335	0.089
54.	70	0.316	0.182	0.316	0.083
55.	71	0.299	0.172	0.299	0.078
56.	72	0.285	0.163	0.285	0.075
57.	73	0.273	0.156	0.273	0.071
58.	74	0.260	0.149	0.260	0.068
59.	75	0.250	0.143	0.250	0.065
60.	76	0.236	0.134	0.236	0.061
61.	77	0.222	0.127	0.222	0.058
62.	78	[illegible]	0.121	0.213	0.055
63.	79	0.203	0.116	0.203	0.053
64.	80	[illegible]	0.109	0.191	0.050
65.	81	[illegible]	0.100	0.176	0.046
66.	82	0.167	0.095	0.167	0.043
67.	83	0.161	0.092	0.161	0.042
68.	84	0.159	0.091	0.159	0.042
69.	85	0.158	0.090	0.158	0.041
70.	86	0.157	0.089	0.157	0.041
71.	87	0.149	0.085	0.149	0.039
72.	88	0.141	0.081	0.141	0.037
73.	89	0.127	0.072	0.127	0.033
74.	90	0.126	0.072	0.126	0.033
75.	91	0.126	0.072	0.126	0.033
76.	92	0.126	0.072	0.126	0.033
77.	93	0.126	0.072	0.126	0.033
78.	94	0.117	0.067	0.117	0.030
79.	95	0.117	0.067	0.117	0.030
80.	96	0.117	0.067	0.117	0.030
81.	97	0.117	0.067	0.117	0.030
82.	98	0.117	0.067	0.117	0.030

```
. save nqr7_R2_R1, replace
(Note: file nqr7_R2_R1.dta not found)
file nqr7_R2_R1.dta saved

.
.
. log close
```

nqr8_R2_R1.do

```
* @RM500
* nqr8: BL-CF differences in mean smoke-years exposure
* based upon empirical smoke-survival curve and mortality
* of claimants in HPA audit files
* Relative risk quitting model hC(t) = pi*hB(t) if T3 > year >= T1
* hC(t) = R2*hB(t) if T3 > year >= T2, where T2 > T1
* hC(t) = R3*hB(t) if year >= T3, where T3 > T2
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)
* Scenario     pre-88 misconduct     Estimate     R1     R2     R3
*    BL              -                  -        1.0    1.0    1.0
*    CF             yes                low       1.0    2.1    1.0
*    CF             yes                mid       1.5    3.0    1.0
*    CF             yes                high      2.0    3.9    1.0

* Input files: nqr, nqr4
clear
prog drop _all
set matsize 800
set rmsg off
set more off

log using nqr8, replace

* Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
* Relative increase in quit rate (on or after year T1) is global variable $R1
* Relative increase in quit rate (on or after year T2) is global variable $R2
* Relative increase in quit rate (on or after year T3) is global variable $R3
* (R3 can be any value, not just 1; T3 can be any value, not just 1999)

* (1) Conditional distribn of birth year pi() among "past" ever smokers

use "nqr"
* Save distribution of yrborn in Matrix pi(t)
qui tab yrborn [w=w], matcell(pi) matrow(t_)
matrix pi = pi'_result(1)
matrix pi = t_, pi
* m = number of rows of pi
* col 1 (year t), col 2(pi(t))
matrix colnames pi = t pi(t)
global m = rowsof(pi)
matrix drop t_
*matrix list pi

* (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

drop _all
* Get L and SB from nqr4 output
use "nqr4"
qui sum x
global xMin = r(min)
global N = _N

* LSB is proportion who are still smoking and alive
gen LSB = L*SB
qui sum LSB
* EB is mean smoke-years taking mortality into account
global EB = r(mean)*$N
di "Mean smoke-years (BL) = ",%9.2f $EB
* LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
gen LSBR1 = .
gen LSBR2 = .
gen LSBR3 = .
gen SC = .
```

```
prog def LSC
* $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
  global T1 = $_1
  global T2 = $_2
  global T3 = $_3
  global R1 = $_4
  global R2 = $_5
  global R3 = $_6
* Check T3 > T2 > T1
  if $T2 <= $T1 | $T3 <= $T2 {
    di "Invalid ",%9.0f $T1,$T2,$T3
    exit
  }
* Compute SB(x)^R1 and L(x)*SB(x)^R1
* Compute SB(x)^R2 and L(x)*SB(x)^R2
* Compute SB(x)^R3 and L(x)*SB(x)^R3
  qui replace LSBR1 = L*SB^$R1
  qui replace LSBR2 = L*SB^$R2
  qui replace LSBR3 = L*SB^$R3
  qui replace SC = 0
* Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
* SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
* Sum over index 'i' (rows of pi)
  local i = 1
  while 'i' <= $m {
    local t = pi['i',1]
*   't' year of birth
    local u1 = $T1 - 't' - $xMin - 1
    local v1 = 'u1' + 1
    local u2 = $T2 - 't' - $xMin - 1
    local v2 = 'u2' + 1
    local u3 = min($T3 - 't' - $xMin - 1,$N)
    local v3 = 'u3' + 1
*   Compute intermediate 'areas'
    local A1 = SB['u1']^(1-$R1)
    local A2 = SB['u2']^($R1-$R2)
    local A3 = SB['u3']^($R2-$R3)
*   'u3' > 'u2' > 'u1' required
*   Case A:
    if 'u3' <= 0 {
      qui replace SC = SC + pi['i',2] * LSBR3
    }
    else {
*   Case B:
      if 'u3' > 0 & 'u2' <= 0 {
        qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
        if 'v3' <= $N {
          qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
        }
      }
      else {
*   Case C:
        if 'u2' > 0 & 'u1' <= 0 {
          qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
          qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
          if 'v3' <= $N {
            qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/$N
          }
        }
        else {
*   Case D:
          qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
          qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
          qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u3'
          if 'v3' <= $N {
```

nqr8_R2_R1.do

```
        qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' in 'v3'/$N
       }
      }
     }
    }
   local i = 'i' + 1
  }
  qui sum SC
  global EC = r(mean)*$N
  di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB,%8.2f $EC,%8.
2f $EB - $EC
end

prog def rangeSC
  di "     T1       T2       T3       R1       R2       R3       XB       XC   deltaX"

  LSC 1954 1963 2001 1.0 2.1 1.0
  qui gen SC_lo = SC
  lab var SC_lo "SC (R=1 post-2000) low est."
  LSC 1954 1963 2001 1.0 2.1 2.1
  LSC 1954 1963 2001 1.0 2.4 1.0
  LSC 1954 1963 2001 1.0 3.0 1.0
  LSC 1954 1963 2001 1.0 3.6 1.0

  LSC 1954 1963 2001 1.5 2.4 1.0

  ******Necker Change: change 3.0 and 1.5 to 1.0******

  *LSC 1954 1963 2001 1.5 3.0 1.0
   LSC 1954 1963 2001 1.0 1.0 1.0

  **************End Necker Change*************

  qui gen SC_ = SC
  lab var SC_ "SC (R=1 post-2000) middle est."
  LSC 1954 1963 2001 1.5 3.0 3.0
  qui gen SC3 = SC
  lab var SC3 "SC (R=3 post-2000) middle est."

  LSC 1954 1963 2001 1.5 3.6 1.0
  LSC 1954 1963 2001 2.0 2.4 1.0
  LSC 1954 1963 2001 2.0 3.0 1.0
  LSC 1954 1963 2001 2.0 3.6 1.0
  LSC 1954 1963 2001 2.0 3.9 1.0
  qui gen SC_hi = SC
  lab var SC_hi "SC (R=1 post-2000) high est."
  LSC 1954 1963 2001 2.0 3.9 3.9

  LSC 1954 1963 1999 1.5 3.0 1.0
  LSC 1954 1963 2000 1.5 3.0 1.0

end

rangeSC

gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1("Proportio
n Still Alive and Smoking")saving(nqr8a,replace)
gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(JJJ)l1("Pro
portion Still Alive and Smoking")saving(nqr8b,replace)

form LSB SC* %7.3f
form x %6.0f
keep x LSB SC_*
```

```
l, nod
save nqr8_R2_R1, replace

log close
R03
```

nqr8.log

```
. * Cutoff years for changes in quit rates are global variables $T1, $T2, $T3
. * Relative increase in quit rate (on or after year T1) is global variable $R1
. * Relative increase in quit rate (on or after year T2) is global variable $R2
. * Relative increase in quit rate (on or after year T3) is global variable $R3
. * (R3 can be any value, not just 1; R2 can be any value, not just 1)
.
. * (1) Conditional distribn of birth year pi() among "past" ever smokers

. use "nqr"

. * Save distribution of yrborn in Matrix pi(t)
. qui tab yrborn [w=w], matcell(pi) matrow(t_)

. matrix pi = pi/_result(1)

. matrix pi = t_, pi

. * m = number of rows of pi
. * col 1 (year t), col 2(pi(t))
. matrix colnames pi = t pi(t)

. global m = rowsof(pi)

. matrix drop t_

. *matrix list pi

. * (2) Compute Mean Years Smoked Among Persons Who Ever Smoked

. drop _all

. * Get L and SB from nqr4 output
. use "nqr4"

. qui sum x

. global xMin = r(min)

. global N = _N


. * LSB is proportion who are still smoking and alive
. gen LSB = L*SB

. qui sum LSB

. * EB is mean smoke-years taking mortality into account
. global EB = r(mean)*$N

. di "Mean smoke-years (BL) = ",%9.2f $EB
Mean smoke-years (BL) =       45.43

. * LSBR3 = L(x)*SB(x)^R3; LSBR2 = L(x)*SB(x)^R2; LSBR1 = L(x)*SB(x)^R1
. gen LSBR1 = .
(82 missing values generated)

. gen LSBR2 = .
(82 missing values generated)

. gen LSBR3 = .
(82 missing values generated)

. gen SC = .
(82 missing values generated)

. program define LSC
  1. * $_1 = T1; $_2 = T2; $_3 = T3; $_4 = R1; $_5 = R2; $_6 = R3
. global T1 = $_1
  2.   global T2 = $_2
  3.   global T3 = $_3
  4.   global R1 = $_4
  5.   global R2 = $_5
  6.   global R3 = $_6
  7. * Check T3 > T2 > T1
. if $T2 <= $T1 | $T3 <= $T2 {
  8.     di "Invalid ",%9.0f $T1,$T2,$T3
  9.     exit
 10.   }
 11. * Compute SB(x)^R1 and L(x)*SB(x)^R1
. * Compute SB(x)^R2 and L(x)*SB(x)^R2
. * Compute SB(x)^R3 and L(x)*SB(x)^R3
. qui replace LSBR1 = L*SB^$R1
 12.   qui replace LSBR2 = L*SB^$R2
 13.   qui replace LSBR3 = L*SB^$R3
 14.   qui replace SC = 0
 15. * Compute SC = SUM(t) pi(t)*L(x)*SB(x)^R3*SB(min(x,T1-t))^(1-R1)*
. * SB(min(x,T2-t))^(R1-R2)*SB(min(x,T3-t))^(R2-R3) for all x
. * Sum over index 'i' (rows of pi)
.   local i = 1
 16.   while 'i' <= $m {
 17.     local t = pi['i',1]
 18. *   't' year of birth
.     local u1 = $T1 - 't' - $xMin - 1
 19.     local v1 = 'u1' + 1
 20.     local u2 = $T2 - 't' - $xMin - 1
 21.     local v2 = 'u2' + 1
 22.     local u3 = min($T3 - 't' - $xMin + 1,$N)
 23.     local v3 = 'u3' + 1
 24. *   Compute intermediate 'areas'
.     local A1 = SB['u1']^(1-$R1)
 25.     local A2 = SB['u2']^($R1-$R2)
 26.     local A3 = SB['u3']^($R2-$R3)
 27. *   'u3' > 'u2' > 'u1' required
. *   Case A:
.     if 'u3' <= 0 {
 28.       qui replace SC = SC + pi['i',2] * LSBR3
 29.     }
 30.     else {
 31. *   Case B:
.       if 'u3' > 0 & 'u2' <= 0 {
 32.         qui replace SC = SC + pi['i',2] * LSBR2 in 1/'u3'
 33.         if 'v3' <= $N {
 34.           qui replace SC = SC + pi['i',2] * LSBR3 * 'A3' in 'v3'/$N
 35.         }
 36.       }
 37.       else {
 38. *   Case C:
.         if 'u2' > 0 & 'u1' <= 0 {
 39.           qui replace SC = SC + pi['i',2] * LSBR1 in 1/'u2'
 40.           qui replace SC = SC + pi['i',2] * LSBR2 * 'A2' in 'v2'/'u3'
 41.           if 'v3' <= $N {
 42.             qui replace SC = SC + pi['i',2] * LSBR3 * 'A2' * 'A3' in 'v3'/
> $N
 43.           }
 44.         }
 45.         else {
```

nqr8.log

```
 46. *    Case D:
.          qui replace SC = SC + pi['i',2] * LSB in 1/'u1'
 47.           qui replace SC = SC + pi['i',2] * LSBR1 * 'A1' in 'v1'/'u2'
 48.           qui replace SC = SC + pi['i',2] * LSBR2 * 'A1' * 'A2' in 'v2'/'u
> 3'
 49.           if 'v3' <= $N {
 50.             qui replace SC = SC + pi['i',2] * LSBR3 * 'A1' * 'A2' * 'A3' i
> n 'v3'/$N
 51.           }
 52.         }
 53.       }
 54.     }
 55.     local i = 'i' + 1
 56.   }
 57.   qui sum SC
 58.   global EC = r(mean)*$N
 59.   di %7.0f $T1,%7.0f $T2,%7.0f $T3,%8.1f $R1,%8.1f $R2,%8.1f $R3,%8.2f $EB
> ,%8.2f $EC,%8.2f $EB - $EC
 60. end

.
. prog def rangeSC
  1.   di "    T1      T2      T3      R1      R2      R3      XB      XC
>   deltaX"
  2.
.   LSC 1954 1963 2001 1.0 2.1 1.0
  3.   qui gen SC_lo = SC
  4.   lab var SC_lo "SC (R=1 post-2000) low est."
  5.   LSC 1954 1963 2001 1.0 2.1 2.1
  6.   LSC 1954 1963 2001 1.0 2.4 1.0
  7.   LSC 1954 1963 2001 1.0 3.0 1.0
  8.   LSC 1954 1963 2001 1.0 3.6 1.0
  9.
.   LSC 1954 1963 2002 1.5 2.4 1.0
 10.
.   ******Wecker Change: change 3.0 and 1.5 to 1.0******
.
.   *LSC 1954 1963 2001 1.5 3.0 1.0
.   LSC 1954 1963 2001 1.0 1.0 1.0
 11.
.   *************End Wecker Change************
.
.   qui gen SC_ = SC
 12.   lab var SC_ "SC (R=1 post-2000) middle est."
 13.   LSC 1954 1963 2001 1.5 3.0 3.0
 14.   qui gen SC3 = SC
 15.   lab var SC3 "SC (R=3 post-2000) middle est."
 16.
.   LSC 1954 1963 2001 1.5 3.6 1.0
 17.   LSC 1954 1963 2001 2.0 2.4 1.0
 18.   LSC 1954 1963 2001 2.0 3.0 1.0
 19.   LSC 1954 1963 2001 2.0 3.6 1.0
 20.   LSC 1954 1963 2001 2.0 3.9 1.0
 21.   qui gen SC_hi = SC
 22.   lab var SC_hi "SC (R=1 post-2000) high est."
 23.   LSC 1954 1963 2001 2.0 3.9 3.9
 24.
.   LSC 1954 1963 1999 1.5 3.0 1.0
 25.   LSC 1954 1963 2000 1.5 3.0 1.0
 26.
.
. end
```

general

asbestos-specific

remove asbestos specific and general quit rate effects (part)

```
. rangeSC
```

T1	T2	T3	R1	R2	R3	XB	XC	deltaX
1954	1963	2001	1.0	2.1	1.0	45.43	37.02	8.41
1954	1963	2001	1.0	2.1	2.1	45.43	36.18	9.25
1954	1963	2001	1.0	2.4	1.0	45.43	35.49	9.94
1954	1963	2001	1.0	3.0	1.0	45.43	33.02	12.41
1954	1963	2001	1.0	3.6	1.0	45.43	31.13	14.30
1954	1963	2001	1.5	2.4	1.0	45.43	34.94	10.49
1954	1963	2001	1.0	1.0	1.0	45.43	45.43	0.00
1954	1963	2001	1.5	3.0	3.0	45.43	31.75	13.67
1954	1963	2001	1.5	3.6	1.0	45.43	30.69	14.74
1954	1963	2001	2.0	2.4	1.0	45.43	34.42	11.01
1954	1963	2001	2.0	3.0	1.0	45.43	32.07	13.36
1954	1963	2001	2.0	3.6	1.0	45.43	30.27	15.16
1954	1963	2001	2.0	3.9	1.0	45.43	29.52	15.91
1954	1963	2001	2.0	3.9	3.9	45.43	28.91	16.51
1954	1963	1999	1.5	3.0	1.0	45.43	32.75	12.68
1954	1963	2000	1.5	3.0	1.0	45.43	32.64	12.79

```
. gr SC_ LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(ii)c(JJ)l1
> ("Proportion Still Alive and Smoking")saving(nqr8a,replace)
(Note: file nqr8a.gph not found)

. gr SC_ SC3 LSB x if x<=75,ylab(0,.25,.5,.75,1)xlab(20,30,40,50,60,70)s(iii)c(
> JJJ)l1("Proportion Still Alive and Smoking")saving(nqr8b,replace)
(Note: file nqr8b.gph not found)

.
. form LSB SC* %7.3f

. form x %6.0f

. keep x LSB SC_*

. l, nod
```

	x	LSB	SC_lo	SC_	SC_hi
1.	17	1.000	1.000	1.000	1.000
2.	18	1.000	1.000	1.000	1.000
3.	19	0.999	0.998	0.999	0.998
4.	20	0.994	0.993	0.994	0.990
5.	21	0.990	0.988	0.990	0.984
6.	22	0.977	0.973	0.977	0.961
7.	23	0.973	0.968	0.973	0.955
8.	24	0.967	0.960	0.967	0.943
9.	25	0.963	0.955	0.963	0.935
10.	26	0.959	0.950	0.959	0.927
11.	27	0.954	0.944	0.954	0.918
12.	28	0.951	0.940	0.951	0.912
13.	29	0.946	0.933	0.946	0.901
14.	30	0.939	0.923	0.939	0.885
15.	31	0.934	0.916	0.934	0.873
16.	32	0.925	0.903	0.925	0.852
17.	33	0.922	0.898	0.922	0.844
18.	34	0.910	0.881	0.910	0.816
19.	35	0.900	0.865	0.900	0.790
20.	36	0.895	0.858	0.895	0.778
21.	37	0.891	0.851	0.891	0.767
22.	38	0.883	0.838	0.883	0.747
23.	39	0.873	0.821	0.873	0.718
24.	40	0.859	0.798	0.859	0.683
25.	41	0.852	0.786	0.852	0.664
26.	42	0.835	0.758	0.835	0.622
27.	43	0.822	0.735	0.822	0.588

nqr8.log

28.	44	0.810	0.715	0.810	0.559
29.	45	0.791	0.682	0.791	0.513
30.	46	0.776	0.657	0.776	0.480
31.	47	0.760	0.631	0.760	0.445
32.	48	0.742	0.601	0.742	[illegible]
33.	49	0.730	0.582	0.730	[illegible]
34.	50	0.706	0.545	0.706	0.341
35.	51	0.695	0.529	0.695	0.323
36.	52	0.678	0.505	0.678	0.297
37.	53	0.659	0.478	0.659	0.270
38.	54	0.642	0.453	0.642	0.245
39.	55	0.618	0.422	0.618	0.216
40.	56	0.596	0.394	0.596	0.192
41.	57	0.573	0.366	0.573	0.168
42.	58	0.559	0.349	0.559	0.155
43.	59	0.536	0.324	0.536	0.137
44.	60	0.510	0.297	0.510	0.118
45.	61	0.492	0.279	0.492	0.107
46.	62	0.473	0.261	0.473	0.096
47.	63	0.448	0.238	0.448	0.083
48.	64	0.428	0.221	0.428	0.074
49.	65	0.411	0.207	0.411	0.067
50.	66	0.390	0.191	0.390	0.060
51.	67	0.374	0.179	0.374	0.055
52.	68	0.355	0.166	0.355	0.049
53.	69	0.335	0.152	0.335	0.044
54.	70	0.316	0.141	0.316	0.040
55.	71	0.299	0.130	0.299	0.036
56.	72	0.285	0.122	0.285	0.034
57.	73	0.273	0.116	0.273	0.032
58.	74	0.260	0.109	0.260	0.030
59.	75	0.250	0.104	0.250	0.028
60.	76	0.236	0.097	0.236	0.026
61.	77	0.222	0.091	0.222	0.024
62.	78	0.213	0.087	0.213	0.023
63.	79	0.203	0.083	0.203	0.022
64.	80	0.191	0.078	0.191	0.021
65.	81	0.176	0.071	0.176	0.019
66.	82	0.167	0.068	0.167	0.018
67.	83	0.161	0.065	0.161	0.017
68.	84	0.159	0.065	0.159	0.017
69.	85	0.158	0.064	0.158	0.017
70.	86	0.157	0.063	0.157	0.017
71.	87	0.149	0.060	0.149	0.016
72.	88	0.141	0.057	0.141	0.015
73.	89	0.127	0.051	0.127	0.014
74.	90	0.126	0.051	0.126	0.014
75.	91	0.126	0.051	0.126	0.014
76.	92	0.126	0.051	0.126	0.014
77.	93	0.126	0.051	0.126	0.014
78.	94	0.117	0.047	0.117	0.013
79.	95	0.117	0.047	0.117	0.013
80.	96	0.117	0.047	0.117	0.013
81.	97	0.117	0.047	0.117	0.013
82.	98	0.117	0.047	0.117	0.013

```
. save nqr8_R2_R1, replace
(Note: file nqr8_R2_R1.dta not found)
file nqr8_R2_R1.dta saved

.
.
. log close
```

ndx4_R2_r2_R1_r1.do

```
* @RM500
* ndx4:  Combines output of ngr8 (quit-rate effect) and nir6 (initiation-rate) effect
* to estimate delta X (change in mean lifetime years of smoking) for past claimants
* Produces low, med, and high estimates for CP scenario without post-2000 misconduct

clear
prog drop _all
set matsize 500
set rmsg off
set more off


log using ndx4, replace
* Future claimants: Effects of decreased initiation
use nir6_r2_r1
* Compute frequency distributions
prog def Freq
 qui gen f$_1 = F$_1 - F$_1[_n-1]
end

Freq B
Freq C_lo
Freq C_
Freq C_hi
drop F*
drop in 1
form f* %7.3f
form x %6.0f

* Combine with results on Past Claimants: Effect of Increase Quit Rates
merge x using ngr8_R2_R1
ren LSB SB
* Reverse sort order to compute conditional means
gen byte n = _N - _n
sort n
drop n

* Compute conditional means
prog def CondMean
 qui replace S$_1 = S$_1[_n-1] if S$_1 == .
 qui gen m$_1 = sum(S$_1)
 qui replace m$_1 = m$_1/S$_1
end

CondMean B
CondMean C_lo
CondMean C_
CondMean C_hi
keep x f* m*
form m* %7.3f
sort x
drop if SB == .

* Compute Mean Years Smoked (X)
prog def mX
 qui gen s$_1 = f$_1 * m$_1
 qui sum s$_1
 global X$_1 = r(mean)*r(N)
 drop s$_1
end

mX B
mX C_lo
mX C_
mX C_hi

* Baseline scenario: Mean Years Smoked
di %9.1f $XB
prog def Results
 di "---        Decrease in mean years smoked         ---"
 di "Post-2000          Low        Middle        High"
 di "Misconduct         Est.       Est.          Est."
 di "   No       ",%12.1f $XB - $XC_lo,%12.1f $XB - $XC_,%12.1f $XB - $XC_hi
end
Results

* Convert results to matrix & save
* matrix def dX = J(2,3,0)
matrix def dX = J(1,3,0)
matrix dX[1,1] = $XB - $XC_lo
matrix dX[1,2] = $XB - $XC_
matrix dX[1,3] = $XB - $XC_hi
drop _all
svmat dX
gen byte Scenario = _n
lab def Scenario 1"NoPost2000" 2"Post2000"
lab val Scenario Scenario
ren dX1 dX_lo
ren dX2 dX
ren dX3 dX_hi
gen byte Era = 1
lab def Era 1"Past" 2"Future"
lab val Era Era
order Era Scenario dX_lo dX dX_hi
form dX* %9.2f
save ndx4_R2_r2_R1_r1, replace
1
log close

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```

ndx4.log


```
. * Future claimants: Effects of decreased initiation
. use nir6_r2_r1

. * Compute frequency distributions
. prog def Freq
  1.  qui gen f$_1 = F$_1 - F$_1[_n-1]
  2. end

. Freq B

. Freq C_lo

. Freq C_

. Freq C_hi

. drop F*

. drop in 1
(1 observation deleted)

. form f* %7.3f

. form x %6.0f

. * Combine with results on Past Claimants: Effect of Increase Quit Rates
. merge x using ngr8_R2_R1

. ren LSB SB

. * Reverse sort order to compute conditional means
. gen byte n = _N - _n

. sort n

. drop n

. * Compute conditional means
. prog def CondMean
  1.   qui replace S$_1 = S$_1[_n-1] if S$_1 == .
  2.   qui gen m$_1 = sum(S$_1)
  3.   qui replace m$_1 = m$_1/S$_1
  4. end

. CondMean B

. CondMean C_lo

. CondMean C_

. CondMean C_hi

. keep x f* m*

. form m* %7.3f

. sort x

. drop if fB == .
(48 observations deleted)

. * Compute Mean Years Smoked (X)
. prog def mX
  1.  qui gen s$_1 = f$_1 * m$_1
  2.  qui sum s$_1
  3.  global X$_1 = _result(3)*x[_N]
  4.  drop s$_1
  5. end

. mX B

. mX C_lo

. mX C_

. mX C_hi

. * Baseline Scenario: Mean Years Smoked
. di %9.1f $XB
     32.2

. prog def Results
  1.  di "---       Decrease in mean years smoked      ---"
  2.  di "Post-2000          Low         Middle         High"
  3.  di "Misconduct         Est.         Est.          Est."
  4.  di " No      ",%12.1f $XB - $XC_lo,%12.1f $XB - $XC_,%12.1f $XB - $XC_hi
  5. end

. Results
---        Decrease in mean years smoked     ---
Post-2000         Low          Middle         High
Misconduct        Est.          Est.          Est.
 No               6.9           0.0           13.3

.
.
. * Convert results to matrix & save
. * matrix def dX = J(2,3,0)
. matrix def dX = J(1,3,0)

. matrix dX[1,1] = $XB - $XC_lo

. matrix dX[1,2] = $XB - $XC_

. matrix dX[1,3] = $XB - $XC_hi

. drop _all

. svmat dX
number of observations will be reset to 1
Press any key to continue, or Break to abort
obs was 0, now 1

. gen byte Scenario = _n

. lab def Scenario 1"No-Post2000" 2"Post2000"

. lab val Scenario Scenario

. ren dX1 dX_lo

. ren dX2 dX
```

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ndx4.log

```
. ren dX3 dX_hi

. gen byte Era = 1

. lab def Era 1"Past" 2"Future"

. lab val Era Era

. order Era Scenario dX_lo dX dX_hi

. form dX* %9.2f

. save ndx4_R2_r2_R1_r1, replace
(Note: file ndx4_R2_r2_R1_r1.dta not found)
file ndx4_R2_r2_R1_r1.dta saved

. l

        Era    Scenario       dX_lo       dX      dX_hi
  1.    Past   No-Post2000     6.85      0.00     13.[illegible]

. log close
```

c.f. Harris's reduction in mean smoking of 10.65

Ms8a_R2_r2_R1_r1.lim


```
/* LIMDEP 7.0 source code:
   Multivariate normal analysis of:
     1. cumulative incidence of Lung Cancer (diedLC);
     2. prevalence of parenchymal disease (by ILO profusion
        score on X-ray) (Par);
     3. abnormal pulmonary function by spirometric
        determination of FVC) (PFT); and
     4. Pleural injury (anyPleu)
   This 'main' version assumes that there no relationship between
   smoking and pleural injury.
   Exposure results based upon assumption of no misconduct post-2000.
 */

/* Restrict analysis to main sample (2,243) rather than
   extended sample (2,609) */
reject; new; w = 0 $
skip

/* RHS variables (including years smoked, age categories, and
   categories of post-latency asbestos exposure as 'X' */
namelist; X = one, smokYrs, ageG*, T10_* $

/* Separate namelist with years smoked dropped for pleural disease
   dose-response models only */
namelist; Xo = one, ageG*, T10_* $

/* Descriptive statistics (sample means) of RHS variables */
dstat; rhs = X $

/* Save sample mean values of X's (and constant) in X_BL,
   which corresponds to baseline scenario (BL) */
matrix; Xmeans = part(LastDsta, 1, 7, 1, 1) $
/* Append 1 to vector of sample means */
matrix; u = [1] $
matrix; X_BL = [u / Xmeans] $

/* Construct conformal vector for Xo_BL */
dstat; rhs = Xo $
matrix; Xomeans = part(LastDsta, 1, 6, 1, 1) $
matrix; Xo_BL = [u / Xomeans] $

/* Univariate models: Show marginal effects.
   Note: LIMDEP computes partial derivatives dF/dXi, while
   Stata by default shows discrete effects deltaF/deltaXi. */

probit; lhs = diedLC; rhs = X; marginal effects $
matrix; b_LC = B $

probit; lhs = Par; rhs = X; marginal effects $
matrix; b_Par = B $

probit; lhs = PFT; rhs = X; marginal effects $
matrix; b_PFT = B $

/* Note change in RHS for anyPleu */
probit; lhs = anyPleu; rhs = Xo; marginal effects $
matrix; b_Ple = B $

/* Pairwise Bivariate probit models */

bivariate; lhs = diedLC, Par; rh1 = X; rh2 = X;
        start = b_LC, b_Par; marginal effects $
matrix; b_LC = part(B, 1, 8) $
calc; rhoLCPar = rho $

bivariate; lhs = Par, PFT; rh1 = X; rh2 = X;
        start = b_Par, b_PFT; marginal effects $
matrix; b_Par = part(B, 1, 8); b_PFT = part(B, 9, 16) $
calc; rhoParPF = rho $

bivariate; lhs = diedLC, PFT; rh1 = X; rh2 = X;
        start = b_LC, b_PFT; marginal effects $
calc; rhoLCPFT = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = diedLC, anyPleu; rh1 = X; rh2 = Xo;
        start = b_LC, b_Ple; marginal effects $
calc; rhoLCPle = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = Par, anyPleu; rh1 = X; rh2 = Xo;
        start = b_Par, b_Ple; marginal effects $
/* Note change in dimension of b_Ple */
matrix; b_Ple = part(B, 9, 15) $
calc; rhoParPl = rho $

/* Note change in RHS for anyPleu */
bivariate; lhs = PFT, anyPleu; rh1 = X; rh2 = Xo;
        start = b_PFT, b_Ple; marginal effects $
calc; rhoPFTPl = rho $


/* 4x4 Variance-covariance matrix for multivariate
   normal calculations */
matrix; Omega4 = [1 /
                 rhoLCPar, 1/
                 rhoLCPFT, rhoParPF, 1/
                 rhoLCPle, rhoParPl, rhoPFTPl, 1] $

/* 3x3 Variance-covariance submatrix for multivariate
   normal calculations */
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $

/* Computation of indices XB at (baseline) means of X
   from probit models */
matrix; y_LC = X_BL'b_LC $
matrix; y_Par = X_BL'b_Par $
matrix; y_PFT = X_BL'b_PFT $
/* Note change in code for pleural */
matrix; y_Ple = Xo_BL'b_Ple $

/* Counterfactual values of indices (past) - no post-2000 misconduct */
matrix; y_LC_p   = y_LC - 0*Part(b_LC,2,2,1,1) $
matrix; y_LC_pHi = y_LC - 0*Part(b_LC,2,2,1,1) $
matrix; y_LC_pLo = y_LC - 0*Part(B_LC,2,2,1,1) $

matrix; y_Pa_p   = y_Par - 0*Part(b_Par,2,2,1,1) $
matrix; y_Pa_pHi = y_Par - 0*Part(b_Par,2,2,1,1) $
matrix; y_Pa_pLo = y_Par - 0*Part(b_Par,2,2,1,1) $

matrix; y_PF_p   = y_PFT - 0*Part(b_PFT,2,2,1,1) $
matrix; y_PF_pHi = y_PFT - 0*Part(b_PFT,2,2,1,1) $
matrix; y_PF_pLo = y_PFT - 0*Part(b_PFT,2,2,1,1) $

/* Note change in code for pleural disease */
matrix; y_Pl_p   = y_Ple $
matrix; y_Pl_pHi = y_Ple $
matrix; y_Pl_pLo = y_Ple $

/* Counterfactual values of indices (future) - no post-2000 misconduct */
```

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```
matrix; y_LC_f   = y_LC - 12.08*Part(b_LC,2,2,1,1) $
matrix; y_LC_fHi = y_LC - 12.08*Part(b_LC,2,2,1,1) $
matrix; y_LC_fLo = y_LC - 12.08*Part(b_LC,2,2,1,1) $

matrix; y_Pa_f   = y_Par - 12.08*Part(b_Par,2,2,1,1) $
matrix; y_Pa_fHi = y_Par - 12.08*Part(b_Par,2,2,1,1) $
matrix; y_Pa_fLo = y_Par - 12.08*Part(b_Par,2,2,1,1) $

matrix; y_PF_f   = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $
matrix; y_PF_fHi = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $
matrix; y_PF_fLo = y_PFT - 12.08*Part(b_PFT,2,2,1,1) $

/* Note change in code for pleural disease */
matrix; y_Pl_f   = y_Ple $
matrix; y_Pl_fHi = y_Ple $
matrix; y_Pl_fLo = y_Ple $

/* Probability of still getting LC (p11) */
calc; p_LC = phi(y_LC) $
calc; p11_p = phi(y_LC_p)/p_LC $
calc; p11_pLo = phi(y_LC_pLo)/p_LC $
calc; p11_pHi = phi(y_LC_pHi)/p_LC $
calc; p11_f = phi(y_LC_f)/p_LC $
calc; p11_fLo = phi(y_LC_fLo)/p_LC $
calc; p11_fHi = phi(y_LC_fHi)/p_LC $

/* Probability of not getting LC but instead getting
   Disabling BID (Par and PFT) (p21); as well as
   Probability of not getting LC but instead getting
   Non-disabling BID (Par and not PFT) (p31) */

/* Use Greene's sign convention matrix (page 229)*/
matrix; T = [1,0,0/0,1,0/0,0,-1] $
matrix; Omega3A = T*Omega3*T $

matrix; z0 = [y_LC   / y_Pa_p / y_PF_p ] $
matrix; z1 = [y_LC_p / y_Pa_p / y_PF_p ] $
calc; p21_p = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $


matrix; z0 = [y_LC     / y_Pa_pLo / y_PF_pLo ] $
matrix; z1 = [y_LC_pLo / y_Pa_pLo / y_PF_pLo ] $
calc; p21_pLo = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pHi / y_PF_pHi ] $
matrix; z1 = [y_LC_pHi / y_Pa_pHi / y_PF_pHi ] $
calc; p21_pHi = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_f / y_PF_f ] $
matrix; z1 = [y_LC_f / y_Pa_f / y_PF_f ] $
calc; p21_f = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fLo / y_PF_fLo ] $
matrix; z1 = [y_LC_fLo / y_Pa_fLo / y_PF_fLo ] $
calc; p21_fLo = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fHi / y_PF_fHi ] $
matrix; z1 = [y_LC_fHi / y_Pa_fHi / y_PF_fHi ] $
calc; p21_fHi = (Mvn(z0,Omega3) - Mvn(z1,Omega3))/p_LC $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p31_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

/* Collect results in subdiagonal matrices and clean up.*/
matrix; P_p = Iden(4) $
matrix; P_pLo = Iden(4) $
matrix; P_pHi = Iden(4) $
matrix; P_f = Iden(4) $
matrix; P_fLo = Iden(4) $
matrix; P_fHi = Iden(4) $

matrix; P_p(1,1) = p11_p $
matrix; P_p(2,1) = p21_p $
matrix; P_p(3,1) = p31_p $
calc; delete p11_p, p21_p, p31_p $

matrix; P_pLo(1,1) = p11_pLo $
matrix; P_pLo(2,1) = p21_pLo $
matrix; P_pLo(3,1) = p31_pLo $
calc; delete p11_pLo, p21_pLo, p31_pLo $

matrix; P_pHi(1,1) = p11_pHi $
matrix; P_pHi(2,1) = p21_pHi $
matrix; P_pHi(3,1) = p31_pHi $
calc; delete p11_pHi, p21_pHi, p31_pHi $

matrix; P_f(1,1) = p11_f $
matrix; P_f(2,1) = p21_f $
matrix; P_f(3,1) = p31_f $
calc; delete p11_f, p21_f, p31_f $

matrix; P_fLo(1,1) = p11_fLo $
matrix; P_fLo(2,1) = p21_fLo $
matrix; P_fLo(3,1) = p31_fLo $
calc; delete p11_fLo, p21_fLo, p31_fLo $

matrix; P_fHi(1,1) = p11_fHi $
matrix; P_fHi(2,1) = p21_fHi $
matrix; P_fHi(3,1) = p31_fHi $
calc; delete p11_fHi, p21_fHi, p31_fHi $


/* Probability of not getting LC but instead getting
   Pleural disease only (p41) */
/* Construct new 3x3 submatrix of Omega4 that gives only
   correlations of LC, Par, and Pl */

matrix; Omega3 = [1 /
                  rhoLCPar, 1/
                  rhoLCPle, rhoParPl, 1] $

/* As before, use Greene's sign convention matrix (page 229)*/
matrix; T = [1,0,0/0,-1,0/0,0,1] $
matrix; Omega3A = T*Omega3*T $
```

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```
matrix; z0 = [y_LC   / y_Pa_p / y_Pl_p] $
matrix; z1 = [y_LC_p / y_Pa_p / y_Pl_p] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pLo / y_Pl_pLo] $
matrix; z1 = [y_LC_pLo / y_Pa_pLo / y_Pl_pLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_pHi / y_Pl_pHi] $
matrix; z1 = [y_LC_pHi / y_Pa_pHi / y_Pl_pHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC   / y_Pa_f / y_Pl_f] $
matrix; z1 = [y_LC_f / y_Pa_f / y_Pl_f] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fLo / y_Pl_fLo] $
matrix; z1 = [y_LC_fLo / y_Pa_fLo / y_Pl_fLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

matrix; z0 = [y_LC     / y_Pa_fHi / y_Pl_fHi] $
matrix; z1 = [y_LC_fHi / y_Pa_fHi / y_Pl_fHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p41_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_LC $

/* Collect results and clean up. */
matrix; P_p(4,1) = p41_p $
matrix; P_pLo(4,1) = p41_pLo $
matrix; P_pHi(4,1) = p41_pHi $
matrix; P_f(4,1) = p41_f $
matrix; P_fLo(4,1) = p41_fLo $
matrix; P_fHi(4,1) = p41_fHi $
calc; delete p41_p, p41_pLo, p41_pHi $
calc; delete p41_f, p41_fLo, p41_fHi $

/* Probability of Not Getting DBID but getting Non-Disabling
   BID in CF (no LC, Par but No PTF) */
/* Use original omega3 submatrix */
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $
/* Sign matrix on order restrictions */
matrix; T = [-1,0,0/0,1,0/0,0,1] $
matrix; Omega3A = T*Omega3*T $
matrix; z = [y_LC  / y_Par / y_PFT ] $
matrix; zA = T*z $
/* Probability of DBID and not LC in BL */
calc; p_DBID = Mvn(zA, Omega3A) $

/* Probability of still getting DBID in CF */
/* Probability of getting only NBID but not DBID in CF */

matrix; z1 = [y_LC / y_Pa_p / y_PF_p ] $
matrix; z1A = T*z1 $
calc; p22_p = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_p / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_p = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_pLo / y_PF_pLo ] $
matrix; z1A = T*z1 $
calc; p22_pLo = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_pLo / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_pLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_pHi / y_PF_pHi ] $
matrix; z1A = T*z1 $
calc; p22_pHi = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_pHi / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_pHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_f / y_PF_f ] $
matrix; z1A = T*z1 $
calc; p22_f = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_f / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_f = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_fLo / y_PF_fLo ] $
matrix; z1A = T*z1 $
calc; p22_fLo = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_fLo / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_fLo = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

matrix; z1 = [y_LC / y_Pa_fHi / y_PF_fHi ] $
matrix; z1A = T*z1 $
calc; p22_fHi = Mvn(z1A,Omega3A)/p_DBID $
matrix; z0 = [y_LC / y_Pa_fHi / y_PFT ] $
matrix; z0A = T*z0 $
calc; p32_fHi = (Mvn(z0A,Omega3A) - Mvn(z1A,Omega3A))/p_DBID $

/* Collect results and clean up. */
matrix; P_p(2,2) = p22_p $
matrix; P_pLo(2,2) = p22_pLo $
matrix; P_pHi(2,2) = p22_pHi $
matrix; P_f(2,2) = p22_f $
matrix; P_fLo(2,2) = p22_fLo $
matrix; P_fHi(2,2) = p22_fHi $
calc; delete p22_p, p22_pLo, p22_pHi $
calc; delete p22_f, p22_fLo, p22_fHi $

matrix; P_p(3,2) = p32_p $
matrix; P_pLo(3,2) = p32_pLo $
matrix; P_pHi(3,2) = p32_pHi $
matrix; P_f(3,2) = p32_f $
matrix; P_fLo(3,2) = p32_fLo $
matrix; P_fHi(3,2) = p32_fHi $
calc; delete p32_p, p32_pLo, p32_pHi $
calc; delete p32_f, p32_fLo, p32_fHi $

/* Probability of getting only pleural in CF given
DBID in BL */

/* Use Omega4 matrix */
matrix; T = [-1,0,0,0/ 0,1,0,0/ 0,0,1,0/ 0,0,0,1] $
matrix; Omega4A = T*Omega4*T $
```

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Ms8a_R2_r2_R1_r1.lim


```
matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_p] $
matrix; z1 = [y_LC/ y_Pa_p/ y_PFT/ y_Pl_p] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_p = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_pLo] $
matrix; z1 = [y_LC/ y_Pa_pLo/ y_PFT/ y_Pl_pLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_pLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_pHi] $
matrix; z1 = [y_LC/ y_Pa_pHi/ y_PFT/ y_Pl_pHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_pHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_f] $
matrix; z1 = [y_LC/ y_Pa_f/ y_PFT/ y_Pl_f] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_f = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_fLo] $
matrix; z1 = [y_LC/ y_Pa_fLo/ y_PFT/ y_Pl_fLo] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_fLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

matrix; z0 = [y_LC/ y_Par/ y_PFT/ y_Pl_fHi] $
matrix; z1 = [y_LC/ y_Pa_fHi/ y_PFT/ y_Pl_fHi] $
matrix; z0A = T*z0 $
matrix; z1A = T*z1 $
calc; p42_fHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_DBID $

/* Collect results and clean up. */
matrix; P_p(4,2) = p42_p $
matrix; P_pLo(4,2) = p42_pLo $
matrix; P_pHi(4,2) = p42_pHi $
matrix; P_f(4,2) = p42_f $
matrix; P_fLo(4,2) = p42_fLo $
matrix; P_fHi(4,2) = p42_fHi $
calc; delete p42_p, p42_pLo, p42_pHi $
calc; delete p42_f, p42_fLo, p42_fHi $

/* Probability of NBID in BL */
matrix; T = [-1,0,0/ 0,1,0/ 0,0,-1] $
matrix; Omega3 = Part(Omega4, 1, 3, 1, 3) $
matrix; Omega3A = T*Omega3*T $

matrix; z = [y_LC / y_Par / y_PFT] $
matrix; zA = T*z $
calc; p_NBID = Mvn(zA,Omega3A) $

/* Probability of NBID in BL and NBID in CF */

matrix; z0 = [y_LC / y_Pa_p / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_p = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_pLo / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_pLo = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_pHi / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_pHi = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_f / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_f = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_fLo / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_fLo = Mvn(z0A,Omega3A)/p_NBID $

matrix; z0 = [y_LC / y_Pa_fHi / y_PFT] $
matrix; z0A = T*z0 $
calc; p33_fHi = Mvn(z0A,Omega3A)/p_NBID $

/* Collect results and clean up. */
matrix; P_p(3,3) = p33_p $
matrix; P_pLo(3,3) = p33_pLo $
matrix; P_pHi(3,3) = p33_pHi $
matrix; P_f(3,3) = p33_f $
matrix; P_fLo(3,3) = p33_fLo $
matrix; P_fHi(3,3) = p33_fHi $
calc; delete p33_p, p33_pLo, p33_pHi $
calc; delete p33_f, p33_fLo, p33_fHi $

/* Probability of Pl but not NBID in CF given NBID in BL */
/* Use Omega4 matrix */
matrix; T = [-1,0,0,0/ 0,1,0,0/ 0,0,-1,0/ 0,0,0,1] $
matrix; Omega4A = T*Omega4*T $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_p ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_p / y_PFT / y_Pl_p ] $
matrix; z1A = T*z1 $
calc; p43_p = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_pLo ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_pLo / y_PFT / y_Pl_pLo ] $
matrix; z1A = T*z1 $
calc; p43_pLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_pHi ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_pHi / y_PFT / y_Pl_pHi ] $
matrix; z1A = T*z1 $
calc; p43_pHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_f ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_f / y_PFT / y_Pl_f ] $
matrix; z1A = T*z1 $
calc; p43_f = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_fLo ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_fLo / y_PFT / y_Pl_fLo ] $
matrix; z1A = T*z1 $
calc; p43_fLo = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

matrix; z0 = [y_LC / y_Par / y_PFT / y_Pl_fHi ] $
matrix; z0A = T*z0 $
matrix; z1 = [y_LC / y_Pa_fHi / y_PFT / y_Pl_fHi ] $
```

Ms8a_R2_r2_R1_r1.lim

```
matrix; z1A = T'z1 $
calc; p43_fHi = (Mvn(z0A,Omega4A) - Mvn(z1a,Omega4a))/p_NBID $

/* Collect results and clean up. */
matrix; P_p(4,3) = p43_p $
matrix; P_pLo(4,3) = p43_pLo $
matrix; P_pHi(4,3) = p43_pHi $
matrix; P_f(4,3) = p43_f $
matrix; P_fLo(4,3) = p43_fLo $
matrix; P_fHi(4,3) = p43_fHi $
calc; delete p43_p, p43_pLo, p43_pHi $
calc; delete p43_f, p43_fLo, p43_fHi $

/* Probability of pleural injury in BL */
/* Recreate 3x3 submatrix of Omega4 that gives only
   correlations of LC, Par, and Pl */
matrix; Omega3 = [1 /
                 rhoLCPar, 1/
                 rhoLCPle, rhoParPl, 1] $
matrix; T = [-1,0,0/ 0,-1,0/ 0,0,1] $
matrix; Omega3A = T'Omega3'T $
matrix; z0 = [y_LC / y_Par / y_Ple ] $
matrix; z0A = T'z0 $
calc; p_Pl = Mvn(z0A, Omega3A) $

/* Probability of Pl in CF given Pl in BL */
matrix; z1 = [y_LC / y_Par / y_Pl_p] $
matrix; z1A = T'z1 $
calc; p44_p = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_pLo] $
matrix; z1A = T'z1 $
calc; p44_pLo = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_pHi] $
matrix; z1A = T'z1 $
calc; p44_pHi = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_f] $
matrix; z1A = T'z1 $
calc; p44_f = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_fLo] $
matrix; z1A = T'z1 $
calc; p44_fLo = Mvn(z1A,Omega3A)/p_Pl $

matrix; z1 = [y_LC / y_Par / y_Pl_fHi] $
matrix; z1A = T'z1 $
calc; p44_fHi = Mvn(z1A,Omega3A)/p_Pl $

/* Collect results and clean up. */
matrix; P_p(4,4) = p44_p $  ---> tab 73, p.1
matrix; P_pLo(4,4) = p44_pLo $
matrix; P_pHi(4,4) = p44_pHi $
matrix; P_f(4,4) = p44_f $
matrix; P_fLo(4,4) = p44_fLo $
matrix; P_fHi(4,4) = p44_fHi $
calc; delete p44_p, p44_pLo, p44_pHi $
calc; delete p44_f, p44_fLo, p44_fHi $
```


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Dm5_ms8a_R2_r2_R1_r1.do

```
* ®RM500`
* DM5:  Computation of present discounted value (PDV)
* of 'past' non-FDD resolved and unresolved claims.
* Input files:  lv6; "Risk Free Interest Rate"; ms7a
* This version is used ms7a as input file: No effect of smoking on Plural
* Program modifies DM3
clear
prog drop _all
set rmsg off
set more off
set matsize 500

log using dm5_ms8a, replace

* (0) Liquidated value of unresolved claims (based on TDP)
* from [MatrixREV95.xls]Unresolved:
matrix U = (88400, 25400, 51500, 12500)
matrix colnames U = LC NBID DBID Pl
matrix rownames U = LiqVal

* Administrative costs per claim from [MatrixREV95.xls]admin_costs
matrix C = (577 \ 210 )
matrix rownames C = past unres
matrix colnames C = ad_cost
matrix li C


* (1) Compute discount factors
use "Risk Free Interest Rate"
* Drop 1989-1991 (Courts' Preliminary Orders cover only 1992+)
drop in 1/4
qui gen n = 2000 - _n
sort n
gen dFactor = 1 in 1
qui replace dF = dF[_n-1]*(1 + I/100) in 2/9
form dF %9.3f
sort y
drop n I
l

* (2) Merge with lv6; incl. admin costs and unresolved claims
merge year using "lv6"
drop _m

* Estimated Liquidated Values of Unresolved Claims
qui replace VR_LC = U[1,1] if y == 2000
qui replace VS_LC = U[1,1] if y == 2000
qui replace VR_NBID = U[1,2] if y == 2000
qui replace VS_NBID = U[1,2] if y == 2000
qui replace VR_DBID = U[1,3] if y == 2000
qui replace VS_DBID = U[1,3] if y == 2000
qui replace VR_Pl = U[1,4] if y == 2000
qui replace VS_Pl = U[1,4] if y == 2000

* Add admin costs of past resolved claims to LiqVals
qui replace VR_LC = VR_LC + C[1,1] if y < 2000
qui replace VR_NBID = VR_NBID + C[1,1] if y < 2000
qui replace VR_DBID = VR_DBID + C[1,1] if y < 2000
qui replace VR_Pl = VR_Pl + C[1,1] if y < 2000
qui replace VS_LC = VS_LC + C[1,1] if y < 2000
qui replace VS_NBID = VS_NBID + C[1,1] if y < 2000
qui replace VS_DBID = VS_DBID + C[1,1] if y < 2000
qui replace VS_Pl = VS_Pl + C[1,1] if y < 2000

* Add admin costs to unresolved claims to LiqVals
qui replace VR_LC = VR_LC + C[2,1] if y == 2000
qui replace VR_NBID = VR_NBID + C[2,1] if y == 2000
qui replace VR_DBID = VR_DBID + C[2,1] if y == 2000
qui replace VR_Pl = VR_Pl + C[2,1] if y == 2000
qui replace VS_LC = VS_LC + C[2,1] if y == 2000
qui replace VS_NBID = VS_NBID + C[2,1] if y == 2000
qui replace VS_DBID = VS_DBID + C[2,1] if y == 2000
qui replace VS_Pl = VS_Pl + C[2,1] if y == 2000

* (3) Compute PDV of Liq Val + Admin Costs by Dx and Year
qui replace VR_LC = VR_LC * dF
qui replace VR_NBID = VR_NBID * dF
qui replace VR_DBID = VR_DBID * dF
qui replace VR_Pl = VR_Pl * dF
qui replace VS_LC = VS_LC * dF
qui replace VS_NBID = VS_NBID * dF
qui replace VS_DBID = VS_DBID * dF
qui replace VS_Pl = VS_Pl * dF
drop dF

* (4) Convert to matrices (Note: Order needs to be conformal with
*     order of rows in subdiagonal P-matrices in ms7a and ms7)
* RICO
  qui replace YR_LC = 0 if YR_LC == .
  qui replace YR_NBID = 0 if YR_NBID == .
  qui replace YR_DBID = 0 if YR_DBID == .
  qui replace YR_Pl = 0 if YR_Pl == .
  mkmat YR_LC
  mkmat YR_NBID
  mkmat YR_DBID
  mkmat YR_Pl
  matrix YR = YR_LC, YR_DBID, YR_NBID, YR_Pl
  matrix drop YR_LC YR_NBID YR_DBID YR_Pl
  matrix colnames YR = LC DBID NBID Pl
  matrix rownames YR = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li YR, format(%8.0f) title("RICO Claims by Dx Year")

  qui replace VR_LC = 0 if VR_LC == .
  qui replace VR_NBID = 0 if VR_NBID == .
  qui replace VR_DBID = 0 if VR_DBID == .
  qui replace VR_Pl = 0 if VR_Pl == .
  mkmat VR_LC
  mkmat VR_NBID
  mkmat VR_DBID
  mkmat VR_Pl
  matrix VR = VR_LC, VR_DBID, VR_NBID, VR_Pl
  matrix drop VR_LC VR_NBID VR_DBID VR_Pl
  matrix colnames VR = LC DBID NBID Pl
  matrix rownames VR = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li VR, format(%8.0f) title("RICO PDV LiqVal+AdmCost by Dx Year")

* SFA
  qui replace YS_LC = 0 if YS_LC == .
  qui replace YS_NBID = 0 if YS_NBID == .
  qui replace YS_DBID = 0 if YS_DBID == .
  qui replace YS_Pl = 0 if YS_Pl == .
  mkmat YS_LC
  mkmat YS_NBID
  mkmat YS_DBID
  mkmat YS_Pl
  matrix YS = YS_LC, YS_DBID, YS_NBID, YS_Pl
  matrix drop YS_LC YS_NBID YS_DBID YS_Pl
  matrix colnames YS = LC DBID NBID Pl
  matrix rownames YS = 1992 1993 1994 1995 1996 1997 1998 1999 2000
```

Dm5_ms8a_R2_r2_R1_r1.do

```
  matrix li VS, format(%8.0f) title("SFA Claims by Dx Year")

  qui replace VS_LC = 0 if VS_LC == .
  qui replace VS_NBID = 0 if VS_NBID == .
  qui replace VS_DBID = 0 if VS_DBID == .
  qui replace VS_P1 = 0 if VS_P1 == .
  mkmat VS_LC
  mkmat VS_DBID
  mkmat VS_NBID
  mkmat VS_P1
  matrix VS = VS_LC, VS_DBID, VS_NBID, VS_P1
  matrix drop VS_LC VS_NBID VS_DBID VS_P1
  matrix colnames VS = LC DBID NBID P1
  matrix rownames VS = 1992 1993 1994 1995 1996 1997 1998 1999 2000
  matrix li VS, format(%8.0f) title("SFA PDV LiqVal+AdmCost by Dx Year")

* (4) Get P matrix from ms7a
* Note: This file has a slightly format than cr1 (as used in ds3)
drop _all
use ms8a_R2_r2_R1_r1
* Use only "past" estimates of P-matrix
keep if Era == 0
l,nod
* Loop through (low,med,high) (n = 1,2,3)
qui gen double PDV_RICO = .
qui gen double PDV_SFA = .
form PDV* %9.1f
matrix P = J(4,4,0)
prog def getPDV
  global n = 1
  while $n < 3 {
    matrix P[1,1] = p11[$n]
    matrix P[2,1] = p21[$n]
    matrix P[2,2] = p22[$n]
    matrix P[3,1] = p31[$n]
    matrix P[3,2] = p32[$n]
    matrix P[3,3] = p33[$n]
    matrix P[4,1] = p41[$n]
    matrix P[4,2] = p42[$n]
    matrix P[4,3] = p43[$n]
    matrix P[4,4] = p44[$n]
di "case: ", $n
matrix li P
* Compute PDV for both RICO & SFA
    matrix DR = trace(VR * (I(4) - P) * YR')
    qui replace PDV_RICO = DR[1,1]/1e6 in $n
    matrix DS = trace(VS * (I(4) - P) * YS')
    qui replace PDV_SFA = DS[1,1]/1e6 in $n

* Save results in median case (n=2) for graphs and tables
    if $n == 2 {
* FR and FS are annual financial injury from RICO and SFA
      matrix FR = vecdiag(VR * (I(4) - P) * YR')
      matrix FS = vecdiag(VS * (I(4) - P) * YS')
      matrix FR = FR'
      matrix FS = FS'
* ZR and ZS are annual claims by Dx in counterfactual scenario (median case)
      matrix ZR = P * YR'
      matrix ZS = P * YS'
      matrix ZR = ZR'
      matrix ZS = ZS'
    }

    global n = $n + 1
  }
end
getPDV
l Era Range PDV_R PDV_S,nod

* Display results for median case for graphs and tables
drop _all
* Financial injury by year
svmat FR
svmat FS
qui replace FR = FR/1e6
qui replace FS = FS/1e6
gen int year = _n + 1991
svmat ZR
ren ZR1 ZR_LC
ren ZR2 ZR_DBID
ren ZR3 ZR_NBID
ren ZR4 ZR_P1
svmat ZS
ren ZS1 ZS_LC
ren ZS2 ZS_DBID
ren ZS3 ZS_NBID
ren ZS4 ZS_P1
order y FR FS ZR* ZS*
form F* Z* %8.0f
l y F*,nod
l y Z*,nod

save Claims_P,replace

log close
\032
```

dm5_ms8a.log


```
.
. * (0) Liquidated value of unresolved claims (based on TDP)
. * from [MatrixREV95.xls]Unresolved:
. matrix U = (88400, 25400, 51500, 12500)

. matrix colnames U = LC NBID DBID P1

. matrix rownames U = LiqVal

.
. * Administrative costs per claim from [MatrixREV95.xls]admin_costs
. matrix C = (577 \ 210 )

. matrix rownames C = past unres

. matrix colnames C = ad_cost

. matrix li C

C[2,1]
       ad_cost
 past      577
unres      210

.
.
. * (1) Compute discount factors
. use "Risk Free Interest Rate"

. * Drop 1988-1991 (Courts' Preliminary Orders cover only 1992+)
. drop in 1/4
(4 observations deleted)

. qui gen n = 2000 - _n

. sort n

. gen dFactor = 1 in 1
(8 missing values generated)

. qui replace dF = dF[_n-1]*(1 + I/100) in 2/9

. form dF %9.3f

. sort y

. drop n I

. l

        year    dFactor
  1.    1992      1.418
  2.    1993      1.370
  3.    1994      1.331
  4.    1995      1.281
  5.    1996      1.213
  6.    1997      1.153
  7.    1998      1.096
  8.    1999      1.045
  9.    2000      1.000

.
. * (2) Merge with lv6; incl. admin costs and unresolved claims
. merge year using "lv6"

. drop _m

. * Estimated Liquidated Values of Unresolved Claims
. qui replace VR_LC = U[1,1] if y == 2000

. qui replace VS_LC = U[1,1] if y == 2000

. qui replace VR_NBID = U[1,2] if y == 2000

. qui replace VS_NBID = U[1,2] if y == 2000

. qui replace VR_DBID = U[1,3] if y == 2000

. qui replace VS_DBID = U[1,3] if y == 2000

. qui replace VR_P1 = U[1,4] if y == 2000

. qui replace VS_P1 = U[1,4] if y == 2000

.
. * Add admin costs of past resolved claims to LiqVals
. qui replace VR_LC = VR_LC + C[1,1] if y < 2000

. qui replace VR_NBID = VR_NBID + C[1,1] if y < 2000

. qui replace VR_DBID = VR_DBID + C[1,1] if y < 2000

. qui replace VR_P1 = VR_P1 + C[1,1] if y < 2000

. qui replace VS_LC = VS_LC + C[1,1] if y < 2000

. qui replace VS_NBID = VS_NBID + C[1,1] if y < 2000

. qui replace VS_DBID = VS_DBID + C[1,1] if y < 2000

. qui replace VS_P1 = VS_P1 + C[1,1] if y < 2000

.
. * Add admin costs to unresolved claims to LiqVals
. qui replace VR_LC = VR_LC + C[2,1] if y == 2000

. qui replace VR_NBID = VR_NBID + C[2,1] if y == 2000

. qui replace VR_DBID = VR_DBID + C[2,1] if y == 2000

. qui replace VR_P1 = VR_P1 + C[2,1] if y == 2000

. qui replace VS_LC = VS_LC + C[2,1] if y == 2000

. qui replace VS_NBID = VS_NBID + C[2,1] if y == 2000

. qui replace VS_DBID = VS_DBID + C[2,1] if y == 2000

. qui replace VS_P1 = VS_P1 + C[2,1] if y == 2000

.
. * (3) Compute PDV of Liq Val + Admin Costs by Dx and Year
. qui replace VR_LC = VR_LC * dF

. qui replace VR_NBID = VR_NBID * dF

. qui replace VR_DBID = VR_DBID * dF
```

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```
. qui replace VR_P1 = VR_P1 * dF

. qui replace VS_LC = VS_LC * dF

. qui replace VS_NBID = VS_NBID * dF

. qui replace VS_DBID = VS_DBID * dF

. qui replace VS_P1 = VS_P1 * dF

. drop dF

.
. * (4) Convert to matrices (Note: Order needs to be conformal with
. *      order of rows in subdiagonal P-matrices in ms7a and ms7)
. * RICO
.   qui replace YR_LC = 0 if YR_LC == .

.   qui replace YR_NBID = 0 if YR_NBID == .

.   qui replace YR_DBID = 0 if YR_DBID == .

.   qui replace YR_P1 = 0 if YR_P1 == .

.   mkmat YR_LC

.   mkmat YR_NBID

.   mkmat YR_DBID

.   mkmat YR_P1

.   matrix YR = YR_LC, YR_DBID, YR_NBID, YR_P1

.   matrix drop YR_LC YR_NBID YR_DBID YR_P1

.   matrix colnames YR = LC DBID NBID P1

.   matrix rownames YR = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li YR, format(%8.0f) title("RICO Claims by Dx Year")

YR[9,4]:  RICO Claims by Dx Year
          LC     DBID     NBID       P1
1992       0        0        0        0
1993       0        0        0        0
1994       0        0        0        0
1995       0        0        0        0
1996     460       18       50       41
1997     852      601     1165     1024
1998    1408     2386     3823     3811
1999    2265    16423    24116     8291
2000    2960    15359    24575    10674

.
.   qui replace VR_LC = 0 if VR_LC == .

.   qui replace VR_NBID = 0 if VR_NBID == .

.   qui replace VR_DBID = 0 if VR_DBID == .

.   qui replace VR_P1 = 0 if VR_P1 == .

.   mkmat VR_LC

.   mkmat VR_NBID

.   mkmat VR_DBID

.   mkmat VR_P1

.   matrix VR = VR_LC, VR_DBID, VR_NBID, VR_P1

.   matrix drop VR_LC VR_NBID VR_DBID VR_P1

.   matrix colnames VR = LC DBID NBID P1

.   matrix rownames VR = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li VR, format(%8.0f) title("RICO PDV LiqVal+AdmCost by Dx Year")

VR[9,4]:  RICO PDV LiqVal+AdmCost by Dx Year
          LC     DBID     NBID       P1
1992       0        0        0        0
1993       0        0        0        0
1994       0        0        0        0
1995       0        0        0        0
1995  106213    61370    31035    15261
1997  101419    58751    29730    14549
1998   96865    55924    28138    13853
1999   92414    52990    26774    12980
2000   88610    51710    25610    12710

.
. * SFA
.   qui replace YS_LC = 0 if YS_LC == .

.   qui replace YS_NBID = 0 if YS_NBID == .

.   qui replace YS_DBID = 0 if YS_DBID == .

.   qui replace YS_P1 = 0 if YS_P1 == .

.   mkmat YS_LC

.   mkmat YS_NBID

.   mkmat YS_DBID

.   mkmat YS_P1

.   matrix YS = YS_LC, YS_DBID, YS_NBID, YS_P1

.   matrix drop YS_LC YS_NBID YS_DBID YS_P1

.   matrix colnames YS = LC DBID NBID P1

.   matrix rownames YS = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li YS, format(%8.0f) title("SFA Claims by Dx Year")

YS[9,4]:  SFA Claims by Dx Year
          LC     DBID     NBID       P1
1992      14        1        0        0
1993      17        2        0        0
1994     555        6        3        0
1995     933       44       30       21
1996    1612     1003     3356     3722
1997    2405     4262     7262     5453
```

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```
1998   2111   3967    6992   5907
1999   2653  22284   35603  12023
2000   3685  20135   30318  13653

.
.   qui replace VS_LC = 0 if VS_LC == .

.   qui replace VS_NBID = 0 if VS_NBID == .

.   qui replace VS_DBID = 0 if VS_DBID == .

.   qui replace VS_Pl = 0 if VS_Pl == .

.   mkmat VS_LC

.   mkmat VS_DBID

.   mkmat VS_NBID

.   mkmat VS_Pl

.   matrix VS = VS_LC, VS_DBID, VS_NBID, VS_Pl

.   matrix drop VS_LC VS_NBID VS_DBID VS_Pl

.   matrix colnames VS = LC DBID NBID Pl

.   matrix rownames VS = 1992 1993 1994 1995 1996 1997 1998 1999 2000

.   matrix li VS, format(%8.0f) title("SPA PDV LiqVal+AdmCost by Dx Year")

VS[9,4]:  SPA PDV LiqVal+AdmCost by Dx Year
          LC     DBID    NBID      Pl
1992  159788    71719     818     818
1993  131377    69287     790     790
1994  115516    72882   34051     768
1995  113591    69612   33136   16613
1996  106310    62012   31374   15464
1997  101889    59378   30011   14811
1998   97037    56279   28231   13909
1999   92715    52772   26779   12661
2000   88610    51710   25610   12710

.
. * (4) Get P-matrix from ms7a
. * Note: This file has a slightly format than crl (as used in dm3)
. drop _all

. use ms8a_R2_r2_R1_r1

. * Use only 'past' estimates of P-matrix
. keep if Era == 0
(3 observations deleted)

. l,nod

          Era     Range      p11       p21       p22       p31       p32
>         p33       p41      p42       p43       p44
  1.     Past        Lo   1.0000    0.0000    1.0000    0.0000    0.0000
>      1.0000    0.0000   0.0000    0.0000    1.0000
  2.     Past       Med   1.0000    0.0000    1.0000    0.0000    0.0000
>      1.0000    0.0000   0.0000    0.0000    1.0000
  3.     Past        Hi   1.0000    0.0000    1.0000    0.0000    0.0000
>      1.0000    0.0000   0.0000    0.0000    1.0000

. * Loop through (low,med,high) (n = 1,2,3)
. qui gen double PDV_RICO = .

. qui gen double PDV_SFA = .

. form %9.1f

. matrix P = J(4,4,0)

. prog def getPDV
  1.     global n = 1
  2.     while $n <= 3 {
  3.       matrix P[1,1] = p11[$n]
  4.       matrix P[2,1] = p21[$n]
  5.       matrix P[2,2] = p22[$n]
  6.       matrix P[3,1] = p31[$n]
  7.       matrix P[3,2] = p32[$n]
  8.       matrix P[3,3] = p33[$n]
  9.       matrix P[4,1] = p41[$n]
 10.       matrix P[4,2] = p42[$n]
 11.       matrix P[4,3] = p43[$n]
 12.       matrix P[4,4] = p44[$n]
 13. di "case: ", $n
 14. matrix li P
 15. * Compute PDV for both RICO & SFA
.     matrix DR = trace(VR * (I(4) - P) * YR')
 16.       qui replace PDV_RICO = DR[1,1]/1e6 in $n
 17.       matrix DS = trace(VS * (I(4) - P) * YS')
 18.       qui replace PDV_SFA = DS[1,1]/1e6 in $n
 19
. * Save results in median case (n=2) for graphs and tables
.     if $n == 2 {
 20. * FR and FS are annual financial injury from RICO and SFA
.       matrix FR = vecdiag(VR * (I(4) - P) * YR')
 21.          matrix FS = vecdiag(VS * (I(4) - P) * YS')
 22.          matrix FR = FR'
 23.          matrix FS = FS'
 24. * ZR and ZS are annual claims by Dx in counterfactual scenario (median cas
> e)
.       matrix ZR = P * YR'
 25.          matrix ZS = P * YS'
 26.          matrix ZR = ZR'
 27.          matrix ZS = ZS'
 28.       }
 29.
.     global n = $n + 1
 30.   }
 31. end

. getPDV
case:  1

symmetric P[4,4]
    c1  c2  c3  c4
r1   1
r2   0   1
r3   0   0   1
r4   0   0   0   1
case:  2

symmetric P[4,4]
    c1  c2  c3  c4
r1   1
r2   0   1
r3   0   0   1
```

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```
r4   0   0   0   1
case:  3

symmetric P[4,4]
     c1  c2  c3  c4
r1    1
r2    0   1
r3    0   0   1
r4    0   0   0   1

. l Era Range PDV_R PDV_S.nod

          Era      Range   PDV_RICO    PDV_SFA
  1.     Past         Lo        0.0        0.0
  2.     Past        Med        0.0        0.0
  3.     Past         Hi        0.0        0.0

.
. * Display results for median case for graphs and tables
. drop _all

. * Financial injury by year
. svmat FR
number of observations will be reset to 9
Press any key to continue, or Break to abort
obs was 0, now 9

. svmat FS

. qui replace FR = FR/1e6

. qui replace FS = FS/1e6

. gen int year = _n + 1991

. svmat ZR

. ren ZR1 ZR_LC

. ren ZR2 ZR_DBID

. ren ZR3 ZR_NBID

. ren ZR4 ZR_P1

. svmat ZS

. ren ZS1 ZS_LC

. ren ZS2 ZS_DBID

. ren ZS3 ZS_NBID

. ren ZS4 ZS_P1

. order y FR FS ZR* ZS*

. form F* Z* %8.0f

. l y F*.nod

       year      FR1      FS1
  1.   1992        0        0
  2.   1993        0        0
  3.   1994        0        0
  4.   1995        0        0
  5.   1996        0        0
  6.   1997        0        0
  7.   1998        0        0
  8.   1999        0        0
  9.   2000        0        0

. l y Z*.nod

       year   ZR_LC  ZR_DBID  ZR_NBID   ZR_P1   ZS_LC  ZS_DBID  ZS_
NBID     ZS_P1
  1.   1992       0        0        0       0      14        1
  0         0
  2.   1993       0        0        0       0      17        2
>    0         0
  3.   1994       0        0        0       0     555        6
>    0         0
  4.   1995       0        0        0       0     933       44
>    0         0
  5.   1996     450       18       50      41    1612     1003
> 3356      3722
  6.   1997     852      691     1165    1024    2405     4262
> 7262      5453
  7.   1998    1408     2396     3823    3811    2111     3967
> 6992      5907
  8.   1999    2265    16423    24116    8291    2653    22284     3
> 5633     12023
  9.   2000    2960    15359    24575   10674    3685    20135     3
> 0318     13653

. save Claims_P,replace
(Note: file Claims_P.dta not found)
file Claims_P.dta saved

.
. log close
```

go to:
tab 73, p. 6 (formatted)
WEW3, p. 4, fn 14

Wecker changes:
- remove asbestos-specific quit and initiation rate effects (see p. 15, p 26 this tab)
- remove general quit and initiation rate effects (see p. 15, 26 this tab)

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COMMIT - ... - COHORT - DATA - 1988 - 1993

Table: Predictors of Smoking Cessation Between 1988 and 1993 as reported by Hymowitz (1997; Tbl 2) Plus Occupational Group, Estimated Using Logistic Regression from COMMIT Data Produced by Cummings (11/10/00)

— Sample data — — Logistic Regr. — p.3 p.14 (A43 tag) WEW3, p.2 Fn 2

Characteristic	Sample Size	% Quit	As Reported by Hymowitz (1997; Table 2) Odds Ratio*	95% CI	P-value	Predictors Used by Hymowitz (1997;Table 2) & Occup. Group Odds Ratio	95% CI
COMMIT Community**							
0 Comparison	6,733	23.4%	1.00	Referent		1.00	Referent
1 Intervention	6,682	24.6%	1.07	0.98 - 1.17	0.1108	1.07	0.98 - 1.17
	134		$(1.07)^{1/4} = 1.017$				
Sex							
Male	6,599	24.0%	1.00	Referent		1.00	Referent
Female	6,816	23.9%	[illegible]	0.78 - 0.94	0.0009	0.86	0.78 - 0.95
Age (years)							
25-34	4,249	22.8%	1.00	Referent		1.00	Referent
35-44	4,249	22.0%	0.99	0.88 - 1.11	0.8649	0.99	0.88 - 1.11
45-54	2,817	24.6%	[illegible]	1.06 - 1.37	0.0038	1.20	1.06 - 1.37
55-64	2,100	29.3%	1.58	1.37 - 1.81	<.0001	1.57	1.36 - 1.80
Race							
White	10,072	23.3%	1.00	Referent		1.00	Referent
Black	682	27.7%	0.98	0.82 - 1.17	0.8362	0.98	0.82 - 1.17
Hispanic	697	30.0%	1.05	0.87 - 1.28	0.5918	1.05	0.87 - 1.28
Canadian	1,449	23.1%	[illegible]	0.81 - 1.13	0.6142	0.95	0.81 - .12
Asian	138	28.3%	[illegible]	0.59 - 1.37	0.6274	0.91	0.60 - 1.39
American Indian	117	20.5%	0.89	0.55 - 1.45	0.6470	0.89	0.55 - 1.44
Other	42	33.3%	1.49	0.73 - 3.02	0.2695	1.50	0.74 - 3.05
Annual household income							
< $10,000	1,139	20.3%	[illegible]	Referent		1.00	Referent
$10,000 - $25,000	3,750	22.2%	1.15	0.97 - 1.38	0.1168	1.14	0.95 - 1.36
$25,001 - $40,000	4,087	24.2%	[illegible]	1.12 - 1.61	0.0014	1.32	1.10 - 1.58
> $40,000	3,456	26.0%	1.47	1.22 - 1.77	<.0001	1.44	1.19 - 1.73
Education (years)							
<12	2,528	22.4%	1.00	Referent		1.00	Referent
12	3,237	23.9%	1.03	0.89 - 1.19	0.6681	1.02	0.88 - 1..8
13-15	5,367	23.5%	1.00	0.87 - 1.15	0.9944	0.98	0.85 - 1.13
>=16	2,257	26.9%	1.05	0.89 - 1.23	0.6012	1.00	0.84 - 1.19
Frequency of alcohol consumption							
Daily	1,572	20.9%	1.00	Referent		1.00	Referent
3-4 times/week	1,286	21.0%	0.98	0.80 - 1.19	0.8273	0.98	0.80 - 1.19
1-2 times/week	3,064	23.4%	1.09	0.93 - 1.29	0.2829	1.09	0.93 1.29
1-3 times/month	2,299	24.8%	1.24	1.05 - 1.47	0.0137	1.24	1.05 - 48
<1/month or never	5,100	25.6%	1.35	1.16 - 1.57	0.0001	1.35	1.16 - 58

- WEW3, p4

... 1997 ... p. ... Table ...

BEST IMAGE

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BEST COPY

Cigarettes smoked daily in 1988							
>=25	5,566	18.7%	1.00	Referent		1.00	Referent
15-24	4,783	22.7%	1.15	1.03 - 1.29	0.0103	1.15	1.03 - 1.29
5-14	2,356	32.4%	1.59	1.38 - 1.83	<.0001	1.59	1.38 - 1.83
<5	698	46.0%	2.38	1.92 - 2.96	<.0001	2.39	1.93 - 2.98
Age started smoking (years)							
<=15	3,225	21.2%	1.00	Referent		1.00	Referen.
16-19	6,606	23.1%	1.03	0.92 - 1.16	0.5908	1.03	0.92 - 1.16
>=20	3,584	26.1%	1.16	1.01 - 1.32	0.0310	1.16	1.01 - 1.32
Time to first cigarette (minutes)							
<10	4,329	17.9%	1.00	Referent		1.00	Referent
10-30	3,960	21.1%	1.18	1.05 - 1.33	0.0069	1.18	1.05 - 1.33
31-60	2,431	26.2%	1.41	1.23 - 1.62	<.0001	1.41	1.23 - 1.62
>60	2,646	35.9%	1.84	1.59 - 2.14	<.0001	1.84	1.59 - 2.14
Use non-cigarette product							
No	13,003	24.0%	1.00	Referent		1.00	Referent
Yes	408	24.3%	0.86	0.66 - 1.12	0.2554	0.86	0.66 - 1.13
Type of cigarette							
Premium	12,078	24.4%	1.00	Referent		1.00	Referent
Discount	608	18.8%	0.85	0.68 - 1.07	0.1567	0.86	0.68 - 1.07
Generic	173	15.0%	0.64	0.41 - 0.99	0.0427	0.64	0.41 - 0.99
Quit attempts during 12 months prior to baseline							
0	8,235	22.6%	1.00	Referent		1.00	Referent
1	2,427	24.4%	1.07	0.95 - 1.21	0.2468	1.07	0.95 - 1.21
>=2	2,717	27.7%	1.14	1.01 - 1.29	0.0324	1.14	1.01 - 1.29
Desire to quit							
Not at all	2,200	22.2%	1.00	Referent		1.00	Referent
A little	2,116	22.9%	1.20	1.02 - 1.40	0.0296	1.20	1.02 - 1.40
Somewhat	4,126	22.9%	1.13	0.98 - 1.31	0.0890	1.13	0.98 - 1.31
A lot	4,882	26.0%	1.24	1.07 - 1.44	0.0037	1.24	1.07 - 1.44
Number of other household smokers							
0	7,206	25.5%	1.00	Referent		1.00	Referent
>=1	6,209	22.1%	0.87	0.80 - 0.95	0.0026	0.87	0.80 - 0.96
Occupation Group							
Blue Collar	4,686	22.7%	-	- -		1.00	Referent
Professional	3,753	26.2%	-	- -		1.08	0.95 - 1.23
Clerical / Sales	3,182	24.2%	-	- -		1.03	0.91 - 1.17
None / Unknown	423	22.3%	-	- -		0.94	0.81 - 1.10

*Labelled as a relative risk by Hymowitz et. al.

** Not originally presented in the paper

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cascade.lst

Men and Women No ~~Profession~~ Occupation variable

The LOGISTIC Procedure

Model Information

Data Set	WORK.TEMP1	
Response Variable	QUITCIG	quit in 1993
Number of Response Levels	2	
Number of Observations	11734	male + female w/ Non missing RHS var (+ Non missing Quit info)
Link Function	Logit	
Optimization Technique	Fisher's scoring	

Response Profile — Lits, (1993)

+) — 13415 (= 1997, p558)

Ordered Value	QUITCIG	Total Frequency
1	quit >=6mos.	2779
2	smoker (includes	8955

NOTE: 1681 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	12848.429	12389.930
SC	12855.800	12677.369
-2 Log L	12846.429	12311.[illegible]

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	534.4997	38	<.0001
Score	550.5468	38	<.0001
Wald	516.7112	38	<.0001

1978 var

Analysis of Maximum Likelihood Estimates

p-value

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-2.2856	[illegible]	254.2090	<.0001
_sex	1	-0.1593	0.0479	11.0756	0.0009
COMMIT	1	0.0713	[illegible]	2.5431	0.1108
_age1	1	-0.00989	0.0581	0.0290	0.8649
_age2	1	0.1889	[illegible]	8.3561	0.0038
_age3	1	0.4542	0.0712	40.7199	<.0001
_race1	1	-0.0186	0.0899	0.0427	0.8362
_race2	1	0.0528	0.0985	0.2875	0.5918
_race3	1	-0.0428	0.0848	0.2541	0.6142
_race4	1	-0.1037	0.2137	0.2355	0.6274
_race5	1	-0.1124	0.2455	0.2097	0.6470
_race6	1	0.3986	0.3610	1.2195	0.2695
_inc1	1	0.1436	0.0915	2.4600	0.1168
_inc2	1	0.2947	0.0922	10.2250	0.0014
_inc3	1	0.3867	0.0952	16.4880	<.0001
_educ1	1	0.0317	0.0740	0.1838	0.6681
_educ2	1	0.000498	0.0705	0.0000	0.9944
_educ3	1	0.0436	0.0835	0.2732	0.6012
_alc1	1	-0.0219	0.1006	0.0476	0.8273
_alc2	1	0.0896	0.0834	1.1530	0.2829
_alc3	1	0.2160	0.0877	6.0714	0.0137
_alc4	1	0.2994	0.0788	14.4325	0.0001
_amt1	1	0.1420	0.0554	6.5752	0.0103
_amt2	1	0.4617	0.0724	40.6633	<.0001
_amt3	1	0.8687	0.1098	62.6249	<.0001
_strt1	1	0.0319	0.0593	0.2891	0.5908
_strt2	1	0.1460	0.0677	4.6529	0.0310
_frst1	1	0.1661	0.0615	7.2929	0.0069
_frst2	1	0.3440	0.0701	24.0951	<.0001
_frst3	1	0.6122	0.0756	65.6418	<.0001
_nonc	1	-0.1544	0.1358	1.2937	0.2554
_prem1	1	-0.1603	0.1138	1.9861	0.1587
_prem2	1	-0.4519	0.2229	4.1090	0.0427

→ P1

52614 0914

3

cascade.lst

_quit1	1	0.0714	0.0616	1.3411	0.2468
_quit2	1	0.1315	0.0615	4.5753	0.0324
_want1	1	0.1784	0.0820	4.7300	0.0296
_want2	1	0.1244	0.0732	2.8918	0.0890
_want3	1	0.2174	0.0749	8.4298	0.0037
_nums	1	-0.1377	0.0456	9.1032	0.0026

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
_sex	0.853	0.776	0.937
COMMIT	1.074	0.984	1.172
_age1	0.990	0.884	1.110
_age2	1.208	1.063	1.373
_age3	1.575	1.370	1.811
_race1	0.982	0.823	1.171
_race2	1.054	0.869	1.279
_race3	0.958	0.811	1.131
_race4	0.901	0.593	1.371
_race5	0.894	0.552	1.446
_race6	1.490	0.734	3.023
_inc1	1.154	0.965	1.381
_inc2	1.343	1.121	[illegible]
_inc3	1.472	1.221	1.774
_educ1	1.032	0.893	1.193
_educ2	[illegible]	0.871	[illegible]
_educ3	1.045	0.887	1.230
_alc1	0.978	0.803	1.192
_alc2	1.094	0.929	[illegible]
_alc3	1.241	1.045	1.474
_alc4	1.349	1.156	[illegible]
_amt1	1.153	1.034	1.285
_amt2	1.587	1.377	[illegible]
_amt3	2.384	1.922	2.956
_strt1	1.032	0.919	1.160
_strt2	1.157	1.013	1.321
_frst1	1.181	1.047	1.332
_frst2	1.411	[illegible]	[illegible]
_frst3	1.844	1.591	2.139
_nonc	[illegible]	[illegible]	1.118
_prem1	0.852	0.682	1.065
_prem2	0.636	0.441	[illegible]
_quit1	1.074	0.952	1.212
_quit2	1.141	1.011	[illegible]
_want1	1.195	1.018	1.404
_want2	1.133	0.981	1.302
_want3	1.243	1.073	1.439
_nums	0.871	0.797	0.953

Association of Predicted Probabilities and Observed Responses

Percent Concordant	63.8	Somers' D	0.283
Percent Discordant	35.5	Gamma	0.285
Percent Tied	0.6	Tau-a	0.102
Pairs	24885945	c	0.642

→ P1

52614 0915

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cascade.lst

Men, No ~~Profession~~ Occupation VAR

The LOGISTIC Procedure

Model Information

Data Set	WORK.TEMP1	
Response Variable	QUITCIG	quit in 1993
Number of Response Levels	2	
Number of Observations	5841	
Link Function	Logit	
Optimization Technique	Fisher's scoring	

+) - 6599

Response Profile

Ordered Value	QUITCIG	Total Frequency
1	quit >=6mos.	1395
2	smoker (includes	4446

NOTE: 758 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	6423.903	[illegible]
SC	6430.576	[illegible]
-2 Log L	6421.903	[illegible]

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	228.1350	37	<.0001
Score	234.2620	37	<.0001
Wald	222.0174	37	<.0001

Logistic Reg, like C 1997 p 560
Nom Commit Men only

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-2.0721	[illegible]	105.0442	<.0001
COMMIT	1	0.0157	0.0631	0.0618	0.8037
_age1	1	0.0443	[illegible]	0.2997	0.5841
_age2	1	0.1157	0.0942	1.5090	0.2193
_age3	1	0.4867	[illegible]	23.7667	<.0001
_race1	1	-0.1477	[illegible]	1.1652	0.2804
_race2	1	0.0467	0.1306	0.1282	0.7203
_race3	1	0.0118	0.1163	0.0102	0.9195
_race4	1	-0.2787	0.2627	1.1254	0.2888
_race5	1	-0.0826	0.3280	0.0634	0.8012
_race6	1	0.2713	0.4963	0.2988	0.5846
_inc1	1	0.1930	0.1490	1.6782	0.1952
_inc2	1	0.3014	0.1486	4.1169	0.0425
_inc3	1	0.4769	0.1507	10.0162	0.0016
_educ1	1	-0.00536	0.1050	0.0026	0.9593
_educ2	1	-0.0742	0.0979	0.5742	0.4486
_educ3	1	-0.00780	0.1147	0.0046	0.9458
_alc1	1	0.0156	0.1222	0.0163	0.8984
_alc2	1	0.1032	0.1025	1.0141	0.3139
_alc3	1	0.2151	0.1139	3.5682	0.0589
_alc4	1	0.3298	0.0986	11.1856	0.0008
_amt1	1	0.1366	0.0754	3.2771	0.0703
_amt2	1	0.4088	0.1078	14.3800	0.0001
_amt3	1	0.7296	0.1605	20.6711	<.0001
_strt1	1	0.0734	0.0781	0.8829	0.3474
_strt2	1	0.1797	0.0940	3.6576	0.0559
_frst1	1	0.0127	0.0853	0.0222	0.8816
_frst2	1	0.3172	0.0951	11.1173	0.0009
_frst3	1	0.5068	0.1076	22.1837	<.0001
_nonc	1	-0.1263	0.1403	0.8109	0.3678
_prem1	1	-0.1567	0.1661	0.8899	0.3455
_prem2	1	-0.4258	0.3121	1.8617	0.1724
_quit1	1	0.1484	0.0858	2.9908	0.0837

→ wew3, p.2 fn 5

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cascade.lst

_quit2	1	0.2472	0.0889	7.7412	0.0054
_want1	1	-0.0537	0.1133	0.2249	0.6353
_want2	1	-0.0429	0.0999	0.1848	0.6673
_want3	1	-0.00781	0.1018	0.0059	0.9389
_nums	1	-0.1531	0.0645	5.6446	0.0175

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
COMMIT	1.016	0.898	1.149
_age1	1.045	0.892	1.225
_age2	1.123	0.933	1.350
_age3	1.627	1.338	1.978
_race1	0.863	0.660	1.128
_race2	1.048	0.811	1.353
_race3	1.012	0.806	1.271
_race4	0.757	0.452	1.266
_race5	[illegible]	0.484	1.751
_race6	1.312	0.496	3.469
_inc1	1.213	0.906	1.624
_inc2	1.352	1.010	1.809
_inc3	1.611	1.199	2.165
_educ1	0.895	0.810	[illegible]
_educ2	0.929	0.766	1.125
_educ3	0.992	0.792	1.242
_alc1	[illegible]	0.799	[illegible]
_alc2	1.109	0.907	1.355
_alc3	1.240	0.992	1.550
_alc4	1.391	1.146	[illegible]
_amt1	1.146	0.989	1.329
_amt2	[illegible]	1.218	[illegible]
_amt3	2.074	1.515	2.841
_strt1	1.076	0.923	[illegible]
_strt2	1.197	0.996	1.439
_frst1	1.013	0.857	[illegible]
_frst2	1.373	1.140	1.655
_frst3	1.660	1.344	2.050
_nonc	[illegible]	[illegible]	[illegible]
_prem1	0.855	0.617	1.184
_prem2	[illegible]	[illegible]	1.204
_quit1	1.160	[illegible]	1.373
_quit2	1.280	1.076	[illegible]
_want1	0.948	0.759	1.183
_want2	0.958	0.788	[illegible]
_want3	0.992	0.813	1.211
_nums	0.858	0.756	[illegible]

Association of Predicted Probabilities and Observed Responses

Percent Concordant	63.0	Somers' D	0.266
Percent Discordant	36.3	Gamma	0.268
Percent Tied	0.7	Tau-a	0.097
Pairs	6202170	c	0.633

52614 0917

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cascade.lst

Men and Blue Collar

The LOGISTIC Procedure

Model Information

Data Set	WORK.TEMP1	
Response Variable	QUITCIG	quit in 1993
Number of Response Levels	2	
Number of Observations	2747	
Link Function	Logit	
Optimization Technique	Fisher's scoring	

Lake c 1997, p 56°
+Lib p1 this tob
but, ↑ Blue Collar Men Only
Econ. 1

Response Profile

Ordered Value	QUITCIG	Total Frequency
1	quit >=6mos.	622
2	smoker (includes	2125

NOTE: 393 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	2940.879	2898.566
SC	2946.797	3123.[illegible]
-2 Log L	2938.879	2822.566

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	116.3130	37	<.0001
Score	120.4250	37	<.0001
Wald	113.0423	37	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-2.1117	0.2794	57.1295	<.0001
COMMIT	1	0.0161	0.[illegible]	0.0292	0.8643
_age1	1	-0.0123	0.1201	0.0104	0.9187
_age2	1	0.1286	0.1388	0.8594	0.3539
_age3	1	0.6019	0.[illegible]	16.8464	<.0001
_race1	1	-0.2704	0.1957	1.9093	0.1670
_race2	1	0.0999	0.1804	0.3064	0.5799
_race3	1	-0.0713	0.1635	0.1899	0.6630
_race4	1	-0.4066	0.4579	0.7886	0.3745
_race5	1	0.0932	0.4305	0.0468	0.8287
_race6	1	-0.3444	0.7913	0.1894	0.6634
_inc1	1	0.2966	0.1916	2.3970	0.1216
_inc2	1	0.3563	0.1958	3.3138	0.0687
_inc3	1	0.7043	0.2051	11.7950	0.0006
_educ1	1	-0.00883	0.1300	0.0046	0.9459
_educ2	1	-0.0379	0.1290	0.0866	0.7686
_educ3	1	0.0292	0.2316	0.0159	0.8996
_alc1	1	-0.1102	0.1941	0.3223	0.5702
_alc2	1	0.1235	0.1539	0.6435	0.4224
_alc3	1	0.0246	0.1759	0.0196	0.8887
_alc4	1	0.2576	0.1470	3.0706	0.0797
_amt1	1	-0.0232	0.1114	0.0435	0.8348
_amt2	1	0.1655	0.1661	0.9923	0.3192
_amt3	1	0.5940	0.2644	5.0461	0.0247
_strt1	1	0.0223	0.1087	0.0420	0.8376
_strt2	1	0.0377	0.1416	0.0707	0.7903
_frst1	1	0.0493	0.1248	0.1563	0.6936
_frst2	1	0.3332	0.1421	5.4375	0.0130
_frst3	1	0.7462	0.1586	22.1424	<.0001
_nonc	1	-0.1542	0.2048	0.5671	0.4514
_prem1	1	-0.1987	0.2522	0.6205	0.4308
_prem2	1	0.00272	0.4157	0.0000	0.9348
_quit1	1	0.0553	0.1332	0.1722	0.6782

→ wew 3, p 3 Fn 7

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cascade.lst

Men and Blue Collar and No College

The LOGISTIC Procedure

Model Information

Data Set	WORK.TEMP1	
Response Variable	QUITCIG	quit in 1993
Number of Response Levels	2	
Number of Observations	1560	
Link Function	Logit	
Optimization Technique	Fisher's scoring	

Like p7 but no college

Response Profile

Ordered Value	QUITCIG	Total Frequency
1	quit >=6mos.	356
2	smoker (includes	1204

NOTE: 27[illegible] observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	1677.747	166[illegible].128
SC	1683.100	185[illegible]
-2 Log L	1675.747	158[illegible]

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	86.6196	35	<.0001
Score	85.7917	[illegible]	<.0001
Wald	78.3012	35	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-1.9982	0.3457	33.4190	<.0001
COMMIT	[illegible]	-0.0416	0.1260	0.1089	0.7414
_age1	1	0.0140	[illegible]	0.0065	0.9357
_age2	[illegible]	0.1861	0.1823	1.0417	0.3074
_age3	[illegible]	0.8033	[illegible]	19.7473	<.0001
_race1	1	-0.1946	0.2526	0.5936	0.4410
_race2	1	0.0120	0.2411	0.0025	0.9602
_race3	1	0.0284	0.1785	0.0253	0.8736
_race4	1	-13.6471	492.4	0.0008	0.9779
_race5	1	0.1936	0.5536	0.1223	0.7265
_race6	1	-0.4055	1.1332	0.1280	0.7205
_inc1	1	0.2579	0.2363	1.1918	0.2750
_inc2	1	0.2715	0.2459	1.2190	0.2696
_inc3	1	0.5181	0.2688	3.7168	0.0539
_educ1	1	0.0630	0.1353	0.2167	0.6415
_alc1	1	-0.3581	0.2793	1.6444	0.1997
_alc2	1	-0.1003	0.2046	0.2402	0.6240
_alc3	1	0.0113	0.2332	0.0024	0.9613
_alc4	1	0.2208	0.1874	1.3894	0.2385
_amt1	1	-0.0596	0.1473	0.1639	0.6856
_amt2	1	0.0382	0.2275	0.0282	0.8666
_amt3	1	0.5913	0.3690	2.5675	0.1091
_strt1	1	0.2663	0.1406	3.5869	0.0582
_strt2	1	-0.1131	0.2091	0.2927	0.5885
_frst1	1	0.0362	0.1638	0.0489	0.8250
_frst2	1	0.4536	0.1898	5.7116	0.0169
_frst3	1	0.7029	0.2108	11.1147	0.0009
_nonc	1	-0.2640	0.2839	0.8644	0.3525
_prem1	1	-0.5816	0.3775	2.3737	0.1234
_prem2	1	-0.1299	0.6669	0.0379	0.8456
_quit1	1	0.0601	0.1802	0.1111	0.7388
_quit2	1	0.1905	0.1732	1.2102	0.2713
_want1	1	-0.1021	0.2120	0.2318	0.6302

wew3, p.3 fn 7 "also see"

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cascade.lst

_want2	1	0.0354	0.2056	0.0297	0.8632
_want3	1	0.0531	0.1945	0.0744	0.7850
_nums	1	-0.2313	0.1274	3.2939	0.0695

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
COMMIT	0.959	0.749	1.228
_age1	1.014	0.721	1.426
_age2	1.205	0.843	1.722
_age3	2.233	1.567	3.182
_race1	0.823	0.502	1.350
_race2	1.012	0.631	1.623
_race3	1.029	0.725	1.460
_race4	<0.001	<0.001	>999.999
_race5	1.214	0.410	3.592
_race6	0.667	0.072	6.145
_inc1	1.294	0.815	2.056
_inc2	1.312	0.810	2.124
_inc3	1.679	0.991	2.843
_educ1	1.065	0.817	1.388
_alc1	0.699	0.404	1.208
_alc2	0.905	0.606	[illegible]
_alc3	1.011	0.640	1.597
_alc4	1.247	0.864	1.800
_amt1	0.942	0.706	1.257
_amt2	1.039	0.665	1.623
_amt3	1.306	0.876	[illegible]
_strt1	1.305	0.991	1.719
_strt2	0.893	0.593	1.345
_frst1	1.037	0.752	[illegible]
_frst2	1.574	1.085	2.283
_frst3	2.020	1.336	[illegible]
_nonc	0.768	0.440	1.340
_prem1	0.559	0.267	[illegible]
_prem2	0.878	0.238	3.245
_quit1	1.062	0.746	1.512
_quit2	1.210	[illegible]	[illegible]
_want1	0.903	0.596	1.368
_want2	1.036	0.692	1.550
_want3	1.055	0.720	1.544
_nums	0.794	0.618	[illegible]

Association of Predicted Probabilities and Observed Responses

Percent Concordant	65.0	Somers' D	0.306
Percent Discordant	34.4	Gamma	0.308
Percent Tied	0.6	Tau-a	0.108
Pairs	428624	c	0.653

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cascade.lst

Men and Blue Collar and Less Than College Graduate

The LOGISTIC Procedure

Model Information

Data Set	WORK.TEMP1	
Response Variable	QUITCIG	quit in 1993
Number of Response Levels	2	
Number of Observations	2609	
Link Function	Logit	
Optimization Technique	Fisher's scoring	

Like P7 but LT College Grad

Response Profile

Ordered Value	QUITCIG	Total Frequency
1	quit >=6mos.	588
2	smoker (includes	2021

NOTE: 382 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	2786.459	2752.145
SC	2792.325	2969[illegible]
-2 Log L	2784.459	2678.145

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	106.3137	36	<.0001
Score	109.5460	[illegible]	<.0001
Wald	103.1627	36	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-2.0742	0.2846	53.1209	<.0001
COMMIT	1	0.0428	[illegible]	0.1959	0.6581
_age1	1	0.0567	0.1238	0.2098	0.6469
_age2	1	0.0980	0.1437	0.4650	0.4953
_age3	1	0.6073	[illegible]	16.5228	<.0001
_race1	1	-0.3081	0.2039	2.2820	0.1309
_race2	1	0.0479	0.1841	0.0676	0.7948
_race3	1	-0.0844	0.1640	0.2647	0.6069
_race4	1	-0.6691	0.5239	1.6315	0.2015
_race5	1	0.0346	0.4576	0.0057	0.9397
_race6	1	-0.3014	0.7975	0.1429	0.7055
_inc1	1	0.3132	0.1963	2.5466	0.1105
_inc2	1	0.3580	0.2003	3.1956	0.0738
_inc3	1	0.6556	0.2115	9.6113	0.0019
_educ1	1	-0.0145	0.1303	0.0124	0.9112
_educ2	1	-0.0418	0.1296	0.1038	0.7473
_alc1	1	-0.1367	0.2015	0.4603	0.4975
_alc2	1	0.1048	0.1587	0.4364	0.5089
_alc3	1	0.0188	0.1812	0.0108	0.9173
_alc4	1	0.2820	0.1512	3.4771	0.0622
_amt1	1	-0.0650	0.1140	0.3253	0.5684
_amt2	1	0.0995	0.1733	0.3295	0.5659
_amt3	1	0.5740	0.2738	4.3958	0.0360
_strt1	1	0.0540	0.1110	0.2367	0.6266
_strt2	1	0.0627	0.1473	0.1808	0.6707
_frst1	1	0.0533	0.1277	0.1739	0.6767
_frst2	1	0.3602	0.1454	6.1393	0.0132
_frst3	1	0.7464	0.1639	20.7260	<.0001
_nonc	1	-0.2341	0.2125	1.2139	0.2706
_prem1	1	-0.2812	0.2635	1.1388	0.2859
_prem2	1	0.0197	0.4176	0.0022	0.9624
_quit1	1	0.0661	0.1372	0.2324	0.6298
_quit2	1	0.2538	0.1329	3.6458	0.0562

WEW?, p.3 for 7 "also see"

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cascade.lst

_want1	1	-0.1173	0.1683	0.4857	0.4859
_want2	1	0.0558	0.1542	0.1311	0.7173
_want3	1	0.0128	0.1522	0.0071	0.9328
_nums	1	-0.1282	0.0979	1.7151	0.1903

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
COMMIT	1.044	0.864	1.262
_age1	1.058	0.830	1.349
_age2	1.103	0.832	1.462
_age3	1.835	1.370	2.460
_race1	0.735	0.493	1.096
_race2	[illegible]	0.731	1.505
_race3	[illegible]	0.666	1.267
_race4	0.512	0.183	1.430
_race5	1.035	0.422	2.538
_race6	[illegible]	0.155	3.531
_inc1	1.368	0.931	2.009
_inc2	1.430	0.966	2.118
_inc3	[illegible]	1.273	2.915
_educ1	[illegible]	0.763	[illegible]
_educ2	[illegible]	0.744	[illegible]
_alc1	0.872	0.588	[illegible]
_alc2	1.111	0.814	1.516
_alc3	[illegible]	0.714	1.454
_alc4	[illegible]	0.986	[illegible]
_amt1	[illegible]	0.749	[illegible]
_amt2	[illegible]	0.786	1.551
_amt3	[illegible]	1.038	[illegible]
_strt1	[illegible]	0.849	[illegible]
_strt2	1.065	0.798	[illegible]
_frst1	1.055	0.821	[illegible]
_frst2	1.434	1.078	1.906
_frst3	[illegible]	1.530	[illegible]
_nonc	[illegible]	0.522	[illegible]
_prem1	0.755	0.450	[illegible]
_prem2	[illegible]	[illegible]	[illegible]
_quit1	[illegible]	[illegible]	1.398
_quit2	[illegible]	[illegible]	[illegible]
_want1	0.889	[illegible]	[illegible]
_want2	1.057	[illegible]	[illegible]
_want3	[illegible]	0.752	1.365
_nums	[illegible]	0.726	[illegible]

Association of Predicted Probabilities and Observed Responses

Percent Concordant	62.8	Somers' D	0.262
Percent Discordant	36.5	Gamma	0.264
Percent Tied	0.7	Tau-a	0.092
Pairs	1188348	c	0.631

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cascade.lst

Men and Women (Occupation)

The LOGISTIC Procedure

Model Information

Data Set	WORK.TEMP1	
Response Variable	QUITCIG	quit in 1993
Number of Response Levels	2	
Number of Observations	11734	
Link Function	Logit	
Optimization Technique	Fisher's scoring	

Response Profile

Ordered Value	QUITCIG	Total Frequency
1	quit >=6mos.	2779
2	smoker (includes	8955

NOTE: 1681 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	12848.429	12392.645
SC	12855.800	1270[illegible]
-2 Log L	12846.429	12308.645

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	537.7846	41	<.0001
Score	553.7268	[illegible]	<.0001
Wald	519.4951	41	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-2.2725	0.1441	248.8041	<.0001
_sex	1	-0.1519	[illegible]	8.9476	0.0028
COMMIT	1	0.0704	[illegible]	2.4800	0.1153
_age1	1	-0.0143	0.05[illegible]2	0.0607	0.8054
_age2	1	0.1827	[illegible]	7.7959	0.0052
_age3	1	0.4483	0.0713	39.5563	<.0001
_race1	1	-0.0242	0.0901	0.0720	0.7885
_race2	1	0.0506	0.0986	0.2634	0.6078
_race3	1	-0.0494	0.0849	0.3386	0.5606
_race4	1	-0.0926	0.2139	0.1875	0.6650
_race5	1	-0.1153	0.2456	0.2205	0.6387
_race6	1	0.4057	0.3611	1.2621	0.2613
_inc1	1	0.1278	0.0921	1.9276	0.1650
_inc2	1	0.2735	0.0930	8.6413	0.0033
_inc3	1	0.3612	0.0965	14.0088	0.0002
_educ1	1	0.0230	0.0745	0.0952	0.7577
_educ2	1	-0.0197	0.0724	0.0743	0.7851
_educ3	1	-0.00054	0.0891	0.0000	0.9951
_alc1	1	-0.0209	0.1006	0.0432	0.8354
_alc2	1	0.0902	0.0834	1.1687	0.2797
_alc3	1	0.2171	0.0877	6.1324	0.0133
_alc4	1	0.3034	0.0788	14.8076	0.0001
_amt1	1	0.1423	0.0554	6.6050	0.0102
_amt2	1	0.4605	0.0724	40.4296	<.0001
_amt3	1	0.8707	0.1099	62.8118	<.0001
_strt1	1	0.0306	0.0594	0.2658	0.6062
_strt2	1	0.1452	0.0677	4.5967	0.0320
_frst1	1	0.1674	0.0615	7.3987	0.0065
_frst2	1	0.3446	0.0701	24.1694	<.0001
_frst3	1	0.6107	0.0756	65.3168	<.0001
_nonc	1	-0.1487	0.1358	1.1987	0.2736
_prem1	1	-0.1560	0.1138	1.8781	0.1706
_prem2	1	-0.4456	0.2230	3.9924	0.0457

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cascade.lst

_quit1	1	0.0706	0.0617	1.3110	0.2522
_quit2	1	0.1299	0.0615	4.4656	0.0346
_want1	1	0.1779	0.0821	4.7019	0.0301
_want2	1	0.1225	0.0732	2.8019	0.0942
_want3	1	0.2177	0.0749	8.4473	0.0037
_nums	1	-0.1347	0.0457	8.6884	0.0032
_white	1	0.0785	0.0645	1.4836	0.2232
_pink	1	0.0335	0.0638	0.2759	0.5994
_none	1	-0.0593	0.0798	0.5518	0.4576

note: Blue collar is the reference category

→ wew =, p.3 fn 7

Odds Ratio Estimates → p.1 T4.3 tab

Effect	Point Estimate	95% Wald Confidence Limits	
_sex	0.859	0.778	0.949
COMMIT	[illegible]	0.983	1.171
_age1	0.986	0.880	1.105
_age2	1.200	1.056	1.365
_age3	[illegible]	1.361	1.800
_race1	0.996	0.818	1.165
_race2	1.052	0.867	1.276
_race3	[illegible]	0.806	1.124
_race4	[illegible]	0.599	1.386
_race5	[illegible]	0.551	[illegible]
_race6	[illegible]	0.739	[illegible]
_inc1	1.136	0.949	1.361
_inc2	[illegible]	1.095	1.578
_inc3	[illegible]	1.188	[illegible]
_educ1	[illegible]	0.884	[illegible]
_educ2	[illegible]	0.851	[illegible]
_educ3	0.999	0.839	1.190
_alc1	[illegible]	0.804	[illegible]
_alc2	1.094	0.929	[illegible]
_alc3	1.242	1.046	[illegible]
_alc4	1.354	1.160	1.581
_amt1	1.153	1.034	[illegible]
_amt2	[illegible]	1.375	[illegible]
_amt3	2.389	1.926	[illegible]
_strt1	[illegible]	[illegible]	[illegible]
_strt2	1.156	1.013	1.320
_frst1	[illegible]	[illegible]	[illegible]
_frst2	1.411	[illegible]	[illegible]
_frst3	1.842	1.588	[illegible]
_nonc	[illegible]	0.660	1.125
_prem1	[illegible]	0.684	[illegible]
_prem2	[illegible]	0.414	0.992
_quit1	1.073	0.951	[illegible]
_quit2	[illegible]	1.009	[illegible]
_want1	[illegible]	1.017	[illegible]
_want2	1.130	0.979	1.305
_want3	[illegible]	1.073	1.440
_nums	[illegible]	0.799	0.956
_white	[illegible]	0.953	[illegible]
_pink	1.034	0.912	1.172
_none	[illegible]	0.806	[illegible]

Association of Predicted Probabilities and Observed Responses

Percent Concordant	63.9	Somers' D	0.285
Percent Discordant	35.4	Gamma	0.286
Percent Tied	0.6	Tau-a	0.103
Pairs	24885945	c	0.642

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cascade.lst

Men (Occupation) W/ OCCUP.! ~~~ VAR

The LOGISTIC Procedure

Model Information

Data Set	WORK.TEMP1	
Response Variable	QUITCIG	quit in 1993
Number of Response Levels	2	
Number of Observations	5841	
Link Function	Logit	
Optimization Technique	Fisher's scoring	

Response Profile

Ordered Value	QUITCIG	Total Frequency
1	quit >=6mos.	1395
2	smoker (includes	4446

NOTE: 758 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	6423.903	6273.145
SC	6430.576	6546.224
-2 Log L	6421.903	6191.145

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	230.7578	40	<.0001
Score	236.6964	40	<.0001
Wald	224.1694	40	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-2.0292	0.2044	98.5264	<.0001
COMMIT	[illegible]	0.0135	0.0632	0.0457	0.8307
_age1	1	0.0396	[illegible]	0.2380	0.6257
_age2	[illegible]	0.1095	0.0943	1.3456	0.2460
_age3	1	0.4749	[illegible]	22.4447	<.0001
_race1	1	-0.1517	0.1371	1.2254	0.2683
_race2	[illegible]	0.0460	0.1306	0.1240	0.7248
_race3	1	0.00859	0.1164	0.0054	0.9412
_race4	1	-0.2621	0.2632	0.9921	0.3192
_race5	1	-0.0834	0.3284	0.0645	0.7996
_race6	[illegible]	0.2888	0.4958	0.3393	0.5602
_inc1	1	0.1579	0.1507	1.0981	0.2947
_inc2	[illegible]	0.2547	0.1515	2.8274	0.0927
_inc3	[illegible]	0.4253	0.1546	7.5699	0.0059
_educ1	[illegible]	-0.00947	0.1053	0.0081	0.9283
_educ2	1	-0.0835	0.1002	0.6940	0.4048
_educ3	1	-0.0235	0.1222	0.0369	0.8477
_alc1	1	0.0153	0.1222	0.0157	0.9004
_alc2	1	0.1027	0.1025	1.0045	0.3162
_alc3	1	0.2165	0.1139	3.6098	0.0574
_alc4	1	0.3288	0.0987	11.1054	0.0009
_amt1	1	0.1383	0.0755	3.3583	0.0669
_amt2	1	0.4085	0.1078	14.3527	0.0002
_amt3	1	0.7389	0.1609	21.0828	<.0001
_strt1	1	0.0703	0.0782	0.8075	0.3689
_strt2	1	0.1762	0.0940	3.5096	0.0610
_frst1	1	0.0133	0.0853	0.0244	0.8759
_frst2	1	0.3182	0.0952	11.1830	0.0008
_frst3	1	0.5056	0.1076	22.0661	<.0001
_nonc	1	-0.1219	0.1404	0.7536	0.3853
_prem1	1	-0.1569	0.1661	0.8924	0.3448
_prem2	1	-0.4247	0.3122	1.8507	0.1737
_quit1	1	0.1473	0.0859	2.9424	0.0863

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1.5

_quit2	1	0.2433	0.0889	7.4867	0.0062
_want1	1	-0.0563	0.1134	0.2463	0.6197
_want2	1	-0.0445	0.1000	0.1978	0.6565
_want3	1	-0.00701	0.1018	0.0047	0.9451
_nums	1	-0.1499	0.0645	5.4043	0.0201
_white	1	0.0397	0.0834	0.2264	0.6342
_pink	1	0.0581	0.0898	0.4189	0.5175
_none	1	-0.2351	0.1829	1.6519	0.1987

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
COMMIT	1.014	0.896	1.147
_age1	1.040	0.887	1.220
_age2	1.116	0.927	1.342
_age3	1.608	1.321	1.957
_race1	0.859	0.657	1.124
_race2	1.047	0.811	1.353
_race3	1.009	0.803	1.267
_race4	0.769	0.459	1.289
_race5	0.920	0.483	1.751
_race6	1.335	0.505	3.528
_inc1	1.171	0.872	[illegible]
_inc2	1.290	0.959	1.736
_inc3	1.530	1.130	2.072
_educ1	0.991	0.806	1.218
_educ2	0.920	0.756	1.120
_educ3	0.977	0.769	[illegible]
_alc1	1.015	0.799	1.290
_alc2	1.108	0.907	1.354
_alc3	1.242	0.993	[illegible]
_alc4	1.389	1.145	[illegible]
_amt1	1.148	0.990	1.331
_amt2	1.505	1.218	1.859
_amt3	[illegible]	1.527	[illegible]
_strt1	1.072	0.920	1.250
_strt2	1.193	[illegible]	1.434
_frst1	1.013	0.857	1.198
_frst2	1.375	[illegible]	1.656
_frst3	1.658	1.343	2.047
_nonc	0.885	[illegible]	[illegible]
_prem1	0.855	0.617	1.184
_prem2	0.654	0.355	1.206
_quit1	1.159	0.979	[illegible]
_quit2	1.275	1.071	1.518
_want1	0.945	0.757	[illegible]
_want2	0.957	0.786	1.164
_want3	0.993	0.813	1.212
_nums	0.861	0.759	0.977
_white	1.041	0.884	1.225
_pink	1.060	0.889	1.264
_none	0.791	0.552	[illegible]

Association of Predicted Probabilities and Observed Responses

Percent Concordant	63.0	Somers' D	0.268
Percent Discordant	36.3	Gamma	0.269
Percent Tied	0.7	Tau-a	0.097
Pairs	6202170	c	0.634

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cascade.sas

```
options nofmterr ls=128 formdlim='' source2;

%let main= %str(commit
               _age1 _age2 _age3
               _race1 _race2 _race3 _race4 _race5 _race6
               _inc1 _inc2 _inc3
               _educ1 _educ2 _educ3
               _alc1 _alc2 _alc3 _alc4
               _amt1 _amt2 _amt3
               _strt1 _strt2
               _frst1 _frst2 _frst3
               _nonc
               _prem1 _prem2
               _quit1 _quit2
               _want1 _want2 _want3
               _nums);
%let state=%str(ca on ia ma nj nm ny1 ny2 nc or);
%let occup=%str(_white _pink _none);

%let interactOccup=%str(
        whiteXcommit
        pinkXcommit
        noneXcommit);
%let interactWantto=%str(
        want1Xcommit
        want2Xcommit
        want3Xcommit );

proc sort data = d001103.endpoint_1988 out = commit_88;
        by comcode seq_id member;
run;
proc sort data = d001103.endpoint_1993 out = commit_93;
        by comcode seq_id member;
run;

data commit;
        merge commit_88 (in=ina)
              commit_93 (rename = brand88 = brand88_b in=inb);
        by comcode seq_id member;
  if ina = 1 then merge_ = 1;
  if inb = 1 then merge_ = 2;
  if ina = 1 and inb = 1 then merge_ = 3;
run;

%include '/Augment8893data.sas';

proc freq data=temp1;
        tables quitcig;
run cancel;

data temp1;
        set temp1;
        one=1;
run;

proc logistic data=temp1;
        model quitcig = one / noint;
run cancel;
                                                   title 'Men and Women No Profession';

proc logistic data=temp1;
        model quitcig = _sex &main;
        output out=new PREDICTED=PREDICTED;
run;

                                                   title 'Men, No Profession';

proc logistic data=temp1;
        where sex=1;
        model quitcig = &main ;
run;

                                                   title 'Men and Blue Collar';

proc logistic data=temp1;
        where sex=1 and _blue=1  ;
        model quitcig = &main ;
run;

                                                   title 'Men and Blue Collar and No College';

proc logistic data=temp1;
        where sex=1 and _blue=1 and educdetz <= 2 ;
        model quitcig = commit
                        _age1 _age2 _age3
                        _race1 _race2 _race3 _race4 _race5 _race6
                        _inc1 _inc2 _inc3
```

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17

cascade.sas

```
                        _educ1
                        _alc1 _alc2 _alc3 _alc4
                        _amt1 _amt2 _amt3
                        _strt1 _strt2
                        _frst1 _frst2 _frst3
                        _nonc
                        _prem1 _prem2
                        _quit1 _quit2
                        _want1 _want2 _want3
                        _nums ;
run;
                                                  title 'Men and Blue Collar and Less Than College Graduate'
;
proc logistic data=temp1;
     where sex=1 and _blue=1 and educdetz <= 3 ;
     model quitcig = commit
                        _age1 _age2 _age3
                        _race1 _race2 _race3 _race4 _race5 _race6
                        _inc1 _inc2 _inc3
                        _educ1 _educ2
                        _alc1 _alc2 _alc3 _alc4
                        _amt1 _amt2 _amt3
                        _strt1 _strt2
                        _frst1 _frst2 _frst3
                        _nonc
                        _prem1 _prem2
                        _quit1 _quit2
                        _want1 _want2 _want3
                        _nums ;
run;
                                                  title 'Men and Women (Occupation)';
proc logistic data=temp1;
     model quitcig = _sex &main &occup ;
run;

                                                  title 'Men (Occupation)';
proc logistic data=temp1;
     where sex=1;
     model quitcig = &main &occup ;
run;

endsas;
```


52614 0928

table.lst

The afterCount used in the Logistic Regression

community	
Hayward	537
Vallejo	550
Peterborough	695
Brantford	754
Cedar Rapids	684
Davenport	661
Lowell	601
Fitchburg/Leominster	558
Patterson	450
Trenton	526
Las Cruces	628
Sante Fe	612
Yonkers	569
New Rochelle	620
Utica	673
Binghampton/Johnson City	620
Greensboro	612
Raleigh	638
Medford/Ashland	597
Albany/Corvallis	615
Bellingham	597
Longview/[illegible]	618

~ n (non-missing) Quitting

Σ = 13,473

The replication of the Cummings 1.8%

commit		percent
control	10194	0.246703
treatment	10153	0.264726

The Percentages That Go Into the Logistic Regression P3

COMCODE	commit	weighted Percent
1.00	control	0.272804
2.00	treatment	0.242963
3.00	control	0.237084
4.00	treatment	0.226749
5.00	treatment	0.257236
6.00	control	0.214855
7.00	control	0.285627
8.00	treatment	0.285905
9.00	treatment	0.289748
10.00	control	0.281444
11.00	control	0.262309
12.00	treatment	0.286452
13.00	treatment	0.31139
14.00	control	0.279933
15.00	treatment	0.288603
16.00	control	0.228078
17.00	control	0.212261
18.00	treatment	0.269125
19.00	treatment	0.216584
20.00	control	0.225494
21.00	treatment	0.23723
22.00	control	0.21384

% Quit

see Tab 72, p1

table.sas

```
title 'Our equivalent replication of Table 1 (not having imputed data)';

data endpoint1993;
        set end1993.endpnt;
        commit=(comcode in (2 4 5 8 9 12 13 15 18 19 21));
        if comcode in (1 2) then pair=1;
        if comcode in (3 4) then pair=2;
        if comcode in (5 6) then pair=3;
        if comcode in (7 8) then pair=4;
        if comcode in (9 10) then pair=5;
        if comcode in (11 12) then pair=6;
        if comcode in (13 14) then pair=7;
        if comcode in (15 16) then pair=8;
        if comcode in (17 18) then pair=9;
        if comcode in (19 20) then pair=10;
        if comcode in (21 22) then pair=11;
        if (status93=0) then _status93=.;
        if (status93=1) then _status93=0;
        if (status93=-1) then _status93=1;
run;

proc sql;
        title 'The afterCount used in the Logistic Regression';
        select comcode, sum(1) from d001103.endpoint_1993
        group by comcode;

        create table weights as
        select  comcode, commit, sum( intrstat=1 and statextb in (1,2,3) ) as all,
                sum( intrstat=1 and statextb in (1) ) as heavy  from
        (select   a.comcode, a.seq_id, a.member, a.statextb, b.intrstat, b.statexta,
                  case        when a.comcode in (2,4,5,8,9,12,13,15,18,19,21) then 1
                              else 0
                  end as commit
        from end1988.base88_d a left join end1988.base88_2 b
        on a.comcode=b.comcode and a.seq_id=b.seq_id and a.member=b.member)
        group by comcode, commit;
quit;

data weights(keep=weight comcode commit statbas);
        set weights;
        hweight=heavy/all; lweight=1-hweight;
        format statbas statbas.;
        weight=hweight; statbas=1; output;
        weight=lweight; statbas=2; output;
run;

proc sql;
        create table woweight as
        select   a.comcode,
                 a.commit format=commit_.,
                 a.statbas format=statbas.,
                 count(*) as count,
                 mean(_status93) as percent
        from endpoint1993 as a
        group by comcode, commit,  statbas;

        create table _table_ as
                select   comcode, commit, sum(count) as count, sum(_weightedPercent) as weightedPercent
                      from (  select a.*, b.weight, a.percent*b.weight as _weightedPercent
                              from   woweight as a,
                              weights as b
                              where a.comcode=b.comcode and a.commit=b.commit and a.statbas=b.statbas   )
                group by comcode, commit;

        title 'The replication of the Cummings 1.8%';
        select commit format=commit_., sum(count), mean(weightedPercent) as percent
             from _table_
             group by commit;

        title 'The Percentages That Go Into the Logistic Regression';
        select comcode, commit, weightedPercent from _table_;
quit;
```

52614 0930

2

logisticRegression.lst

InterventionCity Crossed with Time Crossed with State

Intervention is Interaction of InterventionCity and Time

The LOGISTIC Procedure

Model Information

Data Set	WORK.BEFOREAFTER
Response Variable (Events)	Events
Response Variable (Trials)	Trials
Number of Observations	44
Link Function	Logit
Optimization Technique	Fisher's scoring

before MG, P31

after

CityName OR Time Intervention city

Time
1=after
0=before

Intervention city
1=Intervention
0=control

Response Profile

Ordered Value	Binary Outcome	Total Frequency
1	[illegible]nt	40206
2	Nonevent	105209

Model Convergence Status

Convergence criterion (GCO[illegible]E-8) satisfied.

{ca, ont, ..., OR}

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	171477.98	17087[illegible]
SC	171487.87	17101[illegible].02
-2 Log L	171475.98	17084[illegible]

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	629.3840	13	<.0001
Score	621.4195	13	<.0001
Wald	617.0955	[illegible]	<.0001

= Time * intervention city

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-0.8611	0.0201	1842.3951	<.0001
ca	1	-0.1190	0.0273	19.0379	<.0001
on	1	-0.2962	0.0277	114.3997	<.0001
ia	1	-0.0667	0.0270	6.1201	0.0134
ma	1	-0.1472	0.0273	29.0393	<.0001
nj	1	-0.4348	0.0285	232.3970	<.0001
nm	1	0.1282	0.0265	23.3621	<.0001
ny1	1	-0.0791	0.0271	8.5326	0.0035
ny2	1	-0.1683	0.0273	37.9695	<.0001
nc	1	-0.1104	0.0272	16.5336	<.0001
or	1	-0.0193	0.0269	0.5124	0.4741
time	1	-0.1495	0.0297	25.3590	<.0001
InterventionCity	1	0.0499	0.0123	16.4778	<.0001
intervention	1	0.0436	0.0416	1.0987	0.2946

→ week 3 p.3 to 8

NS

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ca	0.888	0.842	0.937
on	0.744	0.704	0.785
ia	0.935	0.887	0.986
ma	0.863	0.818	0.911
nj	0.647	0.612	0.685
nm	1.137	1.079	1.197
ny1	0.924	0.876	0.974
ny2	0.845	0.801	0.892
nc	0.895	0.849	0.944
or	0.981	0.931	1.034
time	0.861	0.812	0.913
InterventionCity	1.051	1.026	1.077
intervention	1.045	0.963	1.133

logisticRegression.lst

Association of Predicted Probabilities and Observed Responses

Percent Concordant	51.6	Somers' D	0.084
Percent Discordant	43.2	Gamma	0.089
Percent Tied	5.2	Tau-a	0.034
Pairs	4230033054	c	0.542

logisticRegression.lst

InterventionCity is the interaction effect since the analysis is conducted separately for each time period
~~InterventionCity is Crossed with State~~
Shows before the intervention study

The LOGISTIC Procedure

Model Information

Data Set	WORK.BEFOREAFTER
Response Variable (Events)	Events
Response Variable (Trials)	Trials
Number of Observations	22
Link Function	Logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Binary Outcome	Total Frequency
1	Event	36792
2	Nonevent	95208

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	156223.28	15558[illegible]
SC	156233.07	155704.42
-2 Log L	156221.28	15556[illegible]

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	658.3382	11	<.0001
Score	648.5437	11	<.0001
Wald	643.0361	11	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-0.8369	0.0207	1629.0151	<.0001
ca	1	-0.1451	0.0284	26.0814	<.0001
on	1	-0.3272	0.0291	126.6961	<.0001
ia	1	-0.0763	0.0282	7.3216	0.0068
ma	1	-0.1904	0.0286	44.4604	<.0001
nj	1	-0.5009	0.0298	281.8245	<.0001
nm	1	0.1172	0.0277	17.9264	<.0001
ny1	1	-0.1203	0.0283	18.0262	<.0001
ny2	1	-0.2006	0.0286	49.2328	<.0001
nc	1	-0.1277	0.0284	20.2831	<.0001
or	1	-0.0189	0.0280	0.4526	0.5011
InterventionCity	1	0.0500	0.0123	16.4916	<.0001

→ wew?, p. 3 fn 8a

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ca	0.865	0.818	0.914
on	0.721	0.681	0.763
ia	0.927	0.877	0.979
ma	0.827	0.782	0.874
nj	0.606	0.572	0.642
nm	1.124	1.065	1.187
ny1	0.887	0.839	0.937
ny2	0.818	0.774	0.865
nc	0.880	0.833	0.930
or	0.981	0.929	1.037
InterventionCity	1.051	1.026	1.077

= EXP(.0500)

52614 0933

logisticRegression.lst

Association of Predicted Probabilities and Observed Responses

Percent Concordant	51.2	Somers' D	0.087
Percent Discordant	42.6	Gamma	0.093
Percent Tied	6.2	Tau-a	0.035
Pairs	3502892736	c	0.543

logisticRegression.lst

(InterventionCity Crossed with Time) Nested Within State

The LOGISTIC Procedure

Model Information

Data Set	WORK.BEFOREAFTER
Response Variable (Events)	Events
Response Variable (Trials)	Trials
Number of Observations	44
Link Function	Logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Binary Outcome	Total Frequency
[illegible]	Event	40206
[illegible]	[illegible]event	105209

Model Convergence Status

Convergence criterion (GCONV=[illegible]) satisfied.

[illegible]it Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	[illegible]71477.98	17085[illegible]
SC	171487.87	17107[illegible]
-2 Log L	171475.98	17080[illegible].95

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	670.0138	22	<.0001
Score	[illegible]28	[illegible]	<.0001
Wald	657.1045	22	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi Square	Pr > ChiSq
Intercept	1	-0.8360	0.0191	1921.0310	<.0001
ca	1	-0.[illegible]	0.0336	13.1810	0.0003
on	1	-0.[illegible]	0.0340	43.9617	<.0001
ia	1	-0.1165	0.0334	12.1519	0.0005
ma	1	-0.[illegible]	0.0338	27.9818	<.0001
nj	1	-0.3940	0.0353	124.7281	<.0001
nm	1	0.[illegible]	0.0327	3.2808	0.0701
ny1	1	-0.[illegible]714	0.0333	4.6111	0.0318
ny2	1	-0.1880	0.0339	30.8185	<.0001
nc	1	-0.1904	0.0339	31.5794	<.0001
or	1	-0.0388	0.0331	1.3697	0.2419
time	1	-0.1589	0.0296	28.8332	<.0001
ca*InterventionCity	1	0.00638	0.0393	0.0264	0.8710
on*InterventionCity	1	-0.1436	0.0406	12.5396	0.0004
ia*InterventionCity	1	0.0983	0.0385	6.5063	0.0107
ma*InterventionCity	1	0.0632	0.0394	2.5691	0.1090
nj*InterventionCity	1	-0.0830	0.0427	3.7808	0.0518
nm*InterventionCity	1	0.1365	0.0373	13.4162	0.0002
ny1*InterventionCity	1	-0.0155	0.0388	0.1605	0.6887
ny2*InterventionCity	1	0.0391	0.0395	0.9810	0.3220
nc*InterventionCity	1	0.1569	0.0390	16.1409	<.0001
or*InterventionCity	1	0.0388	0.0383	1.0287	0.3105
intervention	1	0.0621	0.0414	2.2469	0.1339

new p.3 for E

N(S)D

All the [illegible] p3 w[illegible]

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
time	[illegible]	0.805	0.904
intervention	1.064	0.981	1.154

Association of Predicted Probabilities and Observed Responses

BEST IMAGE

52614 0935

logisticRegression.lst

Percent Concordant	51.0	Somers' D	0.085
Percent Discordant	42.5	Gamma	0.091
Percent Tied	6.5	Tau-a	0.034
Pairs	4230033054	c	0.542

logisticRegression.lst

InterventionCity is the interaction affect since the analysis is conducted separately for each time period
InterventionCity is Nested in State
Shows before the intervention study

The LOGISTIC Procedure

Model Information

Data Set	WORK.BEFOREAFTER
Response Variable (Events)	Events
Response Variable (Trials)	Trials
Number of Observations	22
Link Function	Logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Binary Outcome	Total Frequency
1	Event	36792
2	Nonevent	95208

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	156223.28	15556[illegible]
SC	1[illegible]6233.07	155773.1[illegible]
-2 Log L	156221.28	15552[illegible]

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	695.7591	20	<.0001
Score	686.0739	20	<.0001
Wald	679.6098	[illegible]	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-0.8[illegible]	0.0198	1684.1342	<.0001
ca	1	-0.1576	0.0350	20.2305	<.0001
on	1	-0.2[illegible]	0.0356	51.3593	<.0001
ia	1	-0.1227	0.0348	12.4031	0.0004
ma	1	-0.2289	0.0354	41.7517	<.0001
nj	1	-0.4595	0.0370	154.6160	<.0001
nm	1	0.0442	0.0341	1.6861	0.1941
ny1	1	-0.1080	0.0348	9.6393	0.0019
ny2	1	-0.2083	0.0353	34.7974	<.0001
nc	1	-0.2032	0.0353	33.1600	<.0001
or	1	-0.0450	0.0345	1.7052	0.1916
caInterventionCity	1	0.0249	0.0408	0.3741	0.5408
onInterventionCity	1	-0.1470	0.0426	11.8858	0.0006
iaInterventionCity	1	0.0920	0.0402	5.2426	0.0220
maInterventionCity	1	0.0764	0.0412	3.4360	0.0638
njInterventionCity	1	-0.0836	0.0447	3.4977	0.0615
nmInterventionCity	1	0.1442	0.0388	13.8352	0.0002
ny1InterventionCity	1	-0.0247	0.0406	0.3700	0.5430
ny2InterventionCity	1	0.0153	0.0413	0.1381	0.7102
ncInterventionCity	1	0.1486	0.0407	13.3541	0.0003
orInterventionCity	1	0.0520	0.0397	1.7173	0.1900

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ca	0.854	0.798	0.915
on	0.775	0.723	0.831
ia	0.885	0.826	0.947
ma	0.795	0.742	0.853

logisticRegression.lst

nj	0.632	0.587	0.679
nm	1.045	0.978	1.117
ny1	0.898	0.839	0.961
ny2	0.812	0.758	0.870
nc	0.816	0.762	0.875
or	0.956	0.894	1.023
caInterventionCity	1.025	0.947	1.111
onInterventionCity	0.863	0.794	0.939
iaInterventionCity	1.096	1.013	1.186
maInterventionCity	1.079	0.996	1.170
njInterventionCity	0.920	0.843	1.004
nmInterventionCity	1.155	1.071	1.246
ny1InterventionCity	0.976	0.901	1.056
ny2InterventionCity	1.015	0.937	1.101
ncInterventionCity	1.160	1.071	1.256
orInterventionCity	1.053	0.975	1.139

Association of Predicted Probabilities and Observed Responses

Percent Concordant	51.7	Somers' D	0.088
Percent Discordant	42.9	Gamma	0.093
Percent Tied	5.4	Tau-a	0.035
Pairs	3502892736	c	0.544

logisticRegression.sas

n (non-missing)

```
options formdlim='' ls=128;
data BeforeAfter;
      informat commit $9.;
      infile cards;
      input comcode commit $ after before aftercount;
cards;
    1.00  control              0.272804  .275         537
    2.00  treatment            0.242963  .280         550
    3.00  control              0.237084  .256         695
    4.00  treatment            0.226749  .229         754
    5.00  treatment            0.257236  .301         684
    6.00  control              0.214855  .282         661
    7.00  control              0.285627  .261         601
    8.00  treatment            0.285905  .276         558
    9.00  treatment            0.289748  .205         450
   10.00  control              0.281444  .219         526
   11.00  control              0.262309  .317         628
   12.00  treatment            0.286452  .349         612
   13.00  treatment            0.31139   .280         569
   14.00  control              0.279933  .285         620
   15.00  treatment            0.288603  .268         673
   16.00  control              0.228078  .265         620
   17.00  control              0.212261  .266         612
   18.00  treatment            0.269125  .296         638
   19.00  treatment            0.216984  .308         597
   20.00  control              0.225494  .308         615
   21.00  treatment            0.23722   .328         597
   22.00  control              0.21384   .287         618
;

%let states=%str(ca on ia ma nj nm ny1 ny2 nc or);
%let  _2way_ = %str(ca*InterventionCity on*InterventionCity ia*InterventionCity ma*InterventionCity nj*InterventionCity
                 nm*InterventionCity ny1*InterventionCity ny2*InterventionCity nc*InterventionCity or*InterventionCity
                 ca*time on*time ia*time ma*time nj*time nm*time ny1*time ny2*time nc*time or*time );
%let  _2way_t = %str(ca*InterventionCity on*InterventionCity ia*InterventionCity ma*InterventionCity nj*InterventionCity
                 nm*InterventionCity ny1*InterventionCity ny2*InterventionCity nc*InterventionCity or*InterventionCity );
%let _3way_ = %str( ca*InterventionCity*time on*InterventionCity*time ia*InterventionCity*time
                 ma*InterventionCity*time nj*InterventionCity*time nm*InterventionCity*time
                 ny1*InterventionCity*time ny2*InterventionCity*time nc*InterventionCity*time);

data BeforeAfter;
      set BeforeAfter;
      array _state   ca on ia ma nj nm ny1 ny2 nc or wa;
      do over _state;
            _state=0;
      end;
      one=1;
      select (comcode);
           when(1)  ca =1;   when(2)  ca =1;
           when(3)  on =1;   when(4)  on =1;
           when(5)  ia =1;   when(6)  ia =1;
           when(7)  ma =1;   when(8)  ma =1;
           when(9)  nj =1;   when(10) nj =1;
           when(11) nm =1;   when(12) nm =1;
           when(13) ny1=1;   when(14) ny1=1;
           when(15) ny2=1;   when(16) ny2=1;
           when(17) nc =1;   when(18) nc =1;
           when(19) or =1;   when(20) or =1;
           when(21) wa =1;   when(22) wa =1;
           otherwise;
      end;
      InterventionCity=(commit='treatment');
      state=round(comcode/2);
      time=0;
      quitrate=before;
      intervention=0;
      Events=round(6000*before);
      Trials=6000;
            output;
      time=1;
      Trials=afterCount;
      events=round(aftercount*after);
      quitrate=after;
      intervention=(commit='treatment');
            output;
      drop before after commit aftercount;
run;

proc sort data=BeforeAfter;
      by time;
run;

                                          Title 'InterventionCity Crossed with Time Crossed with State ';
                                          title2 'Intervention is Interaction of InterventionCity and Time';
proc logistic data=BeforeAfter;
      model  events trials= &state time InterventionCity intervention ;
```

52614 0939

logisticRegression.sas

```
run;
                                        title1 'InterventionCity is the interaction affect since the analysis is'
;
                                        title2 'conducted separately for each time period';
                                        title3 'InterventionCity is Crossed with State';
                                        title4 'Shows before the intervention study';

proc logistic data=BeforeAfter;
     where time=0;
     model  events/trials= &state InterventionCity;
run;

                                        Title '(InterventionCity Crossed with Time) Nested Within State ';
                                        title2;
                                        title3;
                                        title4;
proc logistic data=BeforeAfter;
     model  events/trials= &state time  &_2way_t intervention ;
run;

data beforeafter;
     set beforeafter;
     caInterventionCity = ca*InterventionCity;
     onInterventionCity = on*InterventionCity;
     iaInterventionCity = ia*InterventionCity;
     maInterventionCity = ma*InterventionCity;
     njInterventionCity = nj*InterventionCity;
     nmInterventionCity = nm*InterventionCity;
     ny1InterventionCity= ny1*InterventionCity;
     ny2InterventionCity= ny2*InterventionCity;
     ncInterventionCity = nc*InterventionCity;
     orInterventionCity = or*InterventionCity;
run;
                                        title1 'InterventionCity is the interaction affect since the analysis is'
;
                                        title2 'conducted separately for each time period';
                                        title3 'InterventionCity is Nested in State';
                                        title4 'Shows before the intervention study';

proc logistic data=BeforeAfter;
     where time=0;
     model  events/trials=    &state
                 caInterventionCity
                 onInterventionCity
                 iaInterventionCity
                 maInterventionCity
                 njInterventionCity
                 nmInterventionCity
                 ny1InterventionCity
                 ny2InterventionCity
                 ncInterventionCity
                 orInterventionCity ;
 run;
```

52614 0940

diff18.lst

(REPLICATION of .265 - .247 = 1.8% and P value).
1995, p187)

Obs	pval
1	0.03

all permutations
T signif city pair
results → reference dist.

light smokers

Quit Ratios for lm smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	519	0.302
2	Vallejo	intervention	504	0.291
3	Peterborough	comparison	453	0.268
4	Brantford	intervention	475	0.293
5	Davenport	comparison	448	0.255
6	Cedar Rapids	intervention	443	0.321
7	Lowell	comparison	475	0.307
8	Fitchburg/Leominster	intervention	463	0.340
9	Trenton	comparison	472	0.333
10	Patterson	intervention	473	0.332
11	Las Cruces	comparison	482	0.293
12	Sante Fe	intervention	470	0.319
13	New Rochelle	comparison	475	0.306
14	Yonkers	intervention	463	0.340
15	Binghampton/Johnson City	comparison	464	0.264
16	Utica	intervention	473	0.339
17	Greensboro	comparison	456	0.262
18	Raleigh	intervention	492	0.297
19	Albany/Corvallis	comparison	467	0.259
20	Medford/Ashland	intervention	479	0.256
21	Longview/Kelso	comparison	440	0.225
22	Bellingham	intervention	442	0.276

Quit / Quit + smoke

Stats '93 = Basic Permut. Test

Replication of 1995 p. 187
" 1.8%
" p = .03

Σ = 10328

heavy

Quit Ratios for hy smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	435	0.212
2	Vallejo	intervention	442	0.144
3	Peterborough	comparison	489	0.207
4	Brantford	intervention	531	0.167
5	Davenport	comparison	464	0.162
6	Cedar Rapids	intervention	475	0.175
7	Lowell	comparison	497	0.259
8	Fitchburg/Leominster	intervention	428	0.212
9	Trenton	comparison	458	0.165
10	Patterson	intervention	440	0.181
11	Las Cruces	comparison	454	0.188
12	Sante Fe	intervention	450	0.171
13	New Rochelle	comparison	451	0.229
14	Yonkers	intervention	432	0.256
15	[illegible]	comparison	[illegible]	[illegible]
16	Utica	intervention	[illegible]	0.210
17	Greensboro	comparison	462	0.127
18	Raleigh	intervention	455	0.217
19	Albany/Corvallis	comparison	451	0.168
20	Medford/Ashland	intervention	426	0.142
21	Longview/Kelso	comparison	448	0.197
22	Bellingham	intervention	442	0.158

Σ = 10019

(.246 = Σ quitrate w_j ; w_j = # light/wi / # light + Heavy
Row ∈ comparison)

or

Heavy / # light + Heavy

by city

.264 = ditto

Based on 35110
"baseline survey pop"

HAYWARD / VALLEJO Calc
.302 w_1 + .212(1 − w_1) = ①
.291 w_2 + .144(1 − w_2) = ②
Δ = ② − ①

① + ② values, see T0871, p1

Combined Quit Rates

The MEANS Procedure

Variable	Mean
comparison	0.2467027
intervent	0.2647260

p − g = 1.8%

p-value:

52614 0941

1

diff18.sas


```
*options mprint ls=131 ps=45 compress=yes nocenter nodate nonumber source2 mlogic;  *** screen     ***;
options nofmterr ls=225 ps=80 formdlim = ' ' compress=yes nocenter nodate nonumber source2;  *** landsc
ape6 ***;
*options nofmterr mprint ls=104 ps=74 compress=yes nocenter nodate nonumber source2 mlogic;  *** wide6
      ***;
*options mprint ps=100 ls=132 compress=yes nocenter nodate nonumber source2 mlogic;  *** portrait ***;

libname d001103 '/data05a/rjrfalise/COMMIT/001103';
libname end1988 '/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort';
libname eval1989 '/data05a/rjrfalise/COMMIT/001113/1989_Evaluation_Cohort';
libname eval1991 '/data05a/rjrfalise/COMMIT/001113/1991_Evaluation_Cohort';
libname end1993 '/data05a/rjrfalise/COMMIT/001113/1993_Endpoint_Cohort';
libname eval1993 '/data05a/rjrfalise/COMMIT/001113/1993_Evaluation_Cohort';
libname prev1993 '/data05a/rjrfalise/COMMIT/001113/1993_Prevalence_Survey';

%include '/data05a/rjrfalise/COMMIT/001103/commit_endpoint_cohort_data_1988.sasprg';

proc sort data=end1993.endpnt out=endpnt93;
     by comcode seq_id member;

proc sort data=d001103.endpoint_1988(keep=comcode commit) out=comm(nodupkey);
     by comcode;

proc sort data=end1988.base88_d(keep=comcode seq_id member statextb)
        out=detail;
  by comcode seq_id member;

proc sort data=end1988.base88_2(keep=comcode seq_id member intrstat statexta sex)
        out=desc2;
  by comcode seq_id member;

data endpnt93;
    merge endpnt93 (in = a keep = seq_id comcode member statbas status93)
    desc2 (in = b keep = comcode seq_id member sex);
    by comcode seq_id member;
    if a = 1;

data prev;
  merge
    detail(in=in1)
    desc2(in=in2);
  by comcode seq_id member;
  if in1;
*  if sex = 1;
  citypair = round(comcode/2);
  select(comcode);
    when(2,4,5,8,9,12,13,15,18,19,21) commit=1;
    otherwise                         commit=0;
  end;
  n

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1,2,3));
  tables citypair*commit / out=out3a(drop=percent);
run;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1));
  tables citypair*commit / out=out3b(drop=percent);
run;

data weights;
  merge
    out3a(rename=count=n)
    out3b(rename=count=q);
  by citypair commit;
  if commit=0 then control=q/n;
  if commit=1 then treatment=q/n;
  if last.citypair then do;
    std_avg=mean(control,treatment);
    output;
  end;
  retain control treatment;
  drop q n;
run;

data table1;
    merge endpnt93 (in = a keep = seq_id comcode member statbas status93 sex)
    comm (in = b);
    by comcode;
    if a = 1;
    if status93 = 0 then status93 = .;      = non respondent = .
*     if sex = 1;
    if statbas = 1 then heavy = 1;
    if statbas = 2 then heavy = 0;  = light/mod
    status93=-1*status93;
    if status93 = -1 then status93 = 0;     = Smokers = 0
    citypair = round(comcode/2);
                                              => Quit = 1
%macro quitratio(dose, num);

proc means data = table1 nway noprint;
    where heavy = &num;
    class comcode commit;  1 = intervention, 0 = control
    var status93;
    output out=diffs_&dose(rename = (_freq_ = N) mean=quitrate;

data diffs_&dose;
    set diffs_&dose;
    citypair = round(comcode/2);

proc sort data = diffs_&dose;
    by citypair commit;

proc print data = diffs_&dose;
    var comcode commit N quitrate;
    format comcode comcode. quitrate 5.3;
    title 'Quit Ratios for &dose smokers';

proc transpose data = diffs_&dose
            out = diffs_&dose (rename = (col1 = control col2 = treatment));
    var quitrate;
    by citypair;

%mend;

%quitratio(lm,0);
%quitratio(h,1);

** Next, p-val and CI;

data diffs;
  merge
    diffs_lm(rename=(treatment=t_lm
                     control=c_lm))
    diffs_h(rename=(treatment=t_h
                     control=c_h))              quitrate light
    weights;       quitrate
  by citypair;     heavy                        weights for heavy + light smokers
  comparison = c_h*control + c_lm*(1-control);
  intervent = t_h*treatment + t_lm*(1-treatment);
  diff = intervent - comparison;
run;

proc means data = diffs mean;
   var comparison intervent;
   title 'Combined Quit Rates';

%macro pval;

data perms;
  set diffs;
  by citypair;
  array diffs (11) diff01 - diff11;
  diffs(citypair) = diff;
  if citypair=11 then output;
  retain diff01 - diff11;
  keep diff01 - diff11;
run;
```

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diff18.sas

```
data perms2;
  set perms;
  array diffs (11) diff01 - diff11;
  array temps (11) temp01 - temp11;
  do i1 = 0 to 1;
  do i2 = 0 to 1;
  do i3 = 0 to 1;
  do i4 = 0 to 1;
  do i5 = 0 to 1;
  do i6 = 0 to 1;
  do i7 = 0 to 1;
  do i8 = 0 to 1;
  do i9 = 0 to 1;
  do i10 = 0 to 1;
  do i11 = 0 to 1;
    if i1 = 1 then temps(1) = -diffs(1); else temps(1) = diffs(1);
    if i2 = 1 then temps(2) = -diffs(2); else temps(2) = diffs(2);
    if i3 = 1 then temps(3) = -diffs(3); else temps(3) = diffs(3);
    if i4 = 1 then temps(4) = -diffs(4); else temps(4) = diffs(4);
    if i5 = 1 then temps(5) = -diffs(5); else temps(5) = diffs(5);
    if i6 = 1 then temps(6) = -diffs(6); else temps(6) = diffs(6);
    if i7 = 1 then temps(7) = -diffs(7); else temps(7) = diffs(7);
    if i8 = 1 then temps(8) = -diffs(8); else temps(8) = diffs(8);
    if i9 = 1 then temps(9) = -diffs(9); else temps(9) = diffs(9);
    if i10 = 1 then temps(10) = -diffs(10); else temps(10) = diffs(10);
    if i11 = 1 then temps(11) = -diffs(11); else temps(11) = diffs(11);

    avg = sum(of temp01-temp11)/11;
    if sum(of i1-i11) > 0 then obs=0;
                          else obs=1;

    output;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  keep obs avg;
run;

proc sort data=perms2;
  by avg;
run;

data perms2;
  set perms2;
  if obs=1 then do;
    pval = 1 - _n_/2048;
    output;
  end;
run;

proc print data = perms2;
      var pval;
      format pval 5.2;
      title 'p-value: ';
%mend;


%pval;
```

diff18_88.lst

Obs	pval
1	0.18

→ WEW 3, p.3 fig

Quit Ratios for lm smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	519	0.302
2	Vallejo	intervention	504	0.291
3	Peterborough	comparison	453	0.268
4	Brantford	intervention	475	0.293
5	Davenport	comparison	448	0.255
6	Cedar Rapids	intervention	443	0.321
7	Lowell	comparison	475	0.307
8	Fitchburg/Leominster	intervention	463	0.340
9	Trenton	comparison	472	0.333
10	Patterson	intervention	473	0.332
11	Las Cruces	comparison	482	0.293
12	Sante Fe	intervention	470	0.319
13	New Rochelle	comparison	475	0.306
14	Yonkers	intervention	463	0.340
15	Binghampton/Johnson City	comparison	464	0.264
16	Utica	intervention	473	0.339
17	Greensboro	comparison	456	0.262
18	Raleigh	intervention	492	0.297
19	Albany/Corvallis	comparison	467	0.259
20	Medford/Ashland	intervention	479	0.256
21	Longview/Kelso	comparison	440	0.225
22	Bellingham	intervention	442	0.276

$\Delta = \Delta - \Delta'$

where Δ' from Monosized 6, p3 1

Hayward/Vallejo example

$\Delta = \Delta - 0.5$

p1

Monosized 6, p31

Quit Ratios for h smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	435	0.212
2	Vallejo	intervention	442	0.144
3	Peterborough	comparison	489	0.207
4	Brantford	intervention	531	0.167
5	Davenport	comparison	464	0.162
6	Cedar Rapids	intervention	475	0.175
7	Lowell	comparison	497	0.259
8	Fitchburg/Leominster	intervention	428	0.212
9	Trenton	comparison	458	0.165
10	Patterson	intervention	440	0.181
11	Las Cruces	comparison	454	0.188
12	Sante Fe	intervention	450	0.171
[illegible]	New Rochelle	comparison	451	0.229
[illegible]	Yonkers	intervention	432	0.256
[illegible]	[illegible]mpton/[illegible] City	comparison	434	0.171
16	Utica	intervention	455	0.210
17	Greensboro	comparison	462	0.127
18	Raleigh	intervention	455	0.217
19	Albany/Corvallis	comparison	451	0.168
20	Medford/Ashland	intervention	426	0.142
21	Longview/Kelso	comparison	448	0.197
22	Bellingham	intervention	442	0.158

Combined Quit Rates after controlling for pre-88 differences

The MEANS Procedure

Variable	Mean
comparison	0.2467027
intervent	0.2547260

p-value:

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diff18_88.sas

```
*options mprint ls=131 ps=45 compress=yes nocenter nodate nonumber source2 mlogic;  *** screen     ***;
options nofmterr ls=225 ps=80 formdlim = ' ' compress=yes nocenter nodate nonumber source2;  *** landsc
ape6 ***;
*options nofmterr mprint ls=104 ps=74 compress=yes nocenter nodate nonumber source2 mlogic;  *** wide6
     ***;
*options mprint ps=100 ls=132 compress=yes nocenter nodate nonumber source2 mlogic;  *** portrait ***;

libname d001103 '/data05a/rjrfalise/COMMIT/001103';
libname end1988 '/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort';
libname eval1989 '/data05a/rjrfalise/COMMIT/001113/1989_Evaluation_Cohort';
libname eval1991 '/data05a/rjrfalise/COMMIT/001113/1991_Evaluation_Cohort';
libname end1993 '/data05a/rjrfalise/COMMIT/001113/1993_Endpoint_Cohort';
libname eval1993 '/data05a/rjrfalise/COMMIT/001113/1993_Evaluation_Cohort';
libname prev1993 '/data05a/rjrfalise/COMMIT/001113/1993_Prevalence_Survey';

%include '/data05a/rjrfalise/COMMIT/001103/commit_endpoint_cohort_data_1988.sasprg';

proc sort data=end1993.endpnt out=endpnt93;
     by comcode seq_id member;

proc sort data=d001103.endpoint_1988(keep=comcode commit) out=comm nodupkey;
     by comcode;

proc sort data=end1988.base88_d(keep=comcode seq_id member statextb)
          out=detail;
  by comcode seq_id member;

proc sort data=end1988.base88_2(keep=comcode seq_id member intrstat statexta sex)
          out=desc2;
  by comcode seq_id member;

data endpnt93;
     merge endpnt93 (in = a keep = seq_id comcode member statbas status93)
     desc2 (in = b keep = comcode seq_id member sex);
     by comcode seq_id member;
     if a = 1;

data prev;
  merge
    detail(in=in1)
    desc2(in=in2);
  by comcode seq_id member;
  if in1;
* if sex = 1;
  citypair = round(comcode/2);
  select(comcode);
    when(2,4,5,8,9,12,13,15,18,19,21) commit=1;
    therwise                          commit=0;
  end
  ;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1,2,3));
  tables citypair*commit / out=out3a(drop=percent);
run;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1));
  tables citypair*commit / out=out3b(drop=percent);
run;

data weights;
  merge
    out3a(rename=count=n)
    out3b(rename=count=q);
  by citypair commit;
  if commit=0 then control=q/n;
  if commit=1 then treatment=q/n;
  if last.citypair then do;
    std_avg=mean(control,treatment);
    output;
  end;
  retain control treatment;
  drop q n;
run;

data table1;
     merge endpnt93 (in = a keep = seq_id comcode member statbas status93 sex)
     comm (in = b);
     by comcode;
     if a = 1;
     if status93 = 0 then status93 = .;
   * if sex = 1;
     if statbas = 1 then heavy = 1;
     if statbas = 2 then heavy = 0;
     status93=-1*status93;
     if status93 = -1 then status93 = 0;
     citypair = round(comcode/2);

%macro quitratio(dose, num);

proc means data = table1 nway noprint;
     where heavy = &num;
     class comcode commit;
     var status93;
     output out=diffs_&dose(rename = (_freq_ = N) mean=quitrate;

data diffs_&dose;
     set diffs_&dose;
     citypair = round(comcode/2);

proc sort data = diffs_&dose;
     by citypair commit;

proc print data = diffs_&dose;
     var comcode commit N quitrate;
     format comcode comcode. quitrate 5.3;
     title 'Quit Ratios for &dose smokers';

proc transpose data = diffs_&dose
               out = diffs_&dose (rename = (col1 = control col2 = treatment));
     var quitrate;
     by citypair;

%mend;

%quitratio(lm,0);
%quitratio(h,1);

** Next, p-val and CI;

data diffs_pre88;
  input citypair treatment control;
  diff_pre=treatment-control;
cards;
1  .280 .275
2  .229 .256
3  .301 .282
4  .276 .261
5  .205 .219
6  .349 .317
7  .280 .285
8  .268 .265
9  .296 .266
10 .309 .298
11 .328 .287
;
run;

data diffs;
  merge
    diffs_pre88
    diffs_lm(rename=(treatment=t_lm
                     control=c_lm))
    diffs_h(rename=(treatment=t_h
                     control=c_h))
    weights;
  by citypair;
  comparison = c_h*control+c_lm*(1-control);
```

From TABLE 3, MONOGRAPH 6

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diff18_88.sas

```
  intervent = t_h*treatment + t_lm*(1-treatment) - diff_pre;
  diff = intervent - comparison;
run;

proc means data = diffs mean;
   var comparison intervent;
   title 'Combined Quit Rates after controlling for pre-88 differences';

%macro pval;

data perms;
  set diffs;
  by citypair;
  array diffs (11) diff01 - diff11;
  diffs(citypair) = diff;
  if citypair=11 then output;
  retain diff01 - diff11;
  keep diff01 - diff11;
run;

data perms2;
  set perms;
  array diffs (11) diff01 - diff11;
  array temps (11) temp01 - temp11;
  do i1 = 0 to 1;
  do i2 = 0 to 1;
  do i3 = 0 to 1;
  do i4 = 0 to 1;
  do i5 = 0 to 1;
  do i6 = 0 to 1;
  do i7 = 0 to 1;
  do i8 = 0 to 1;
  do i9 = 0 to 1;
  do i10 = 0 to 1;
  do i11 = 0 to 1;
    if i1 = 1 then temps(1) = -diffs(1); else temps(1) = diffs(1);
    if i2 = 1 then temps(2) = -diffs(2); else temps(2) = diffs(2);
    if i3 = 1 then temps(3) = -diffs(3); else temps(3) = diffs(3);
    if i4 = 1 then temps(4) = -diffs(4); else temps(4) = diffs(4);
    if i5 = 1 then temps(5) = -diffs(5); else temps(5) = diffs(5);
    if i6 = 1 then temps(6) = -diffs(6); else temps(6) = diffs(6);
    if i7 = 1 then temps(7) = -diffs(7); else temps(7) = diffs(7);
    if i8 = 1 then temps(8) = -diffs(8); else temps(8) = diffs(8);
    if i9 = 1 then temps(9) = -diffs(9); else temps(9) = diffs(9);
    if i10 = 1 then temps(10) = -diffs(10); else temps(10) = diffs(10);
    if i11 = 1 then temps(11) = -diffs(11); else temps(11) = diffs(11);

    avg = sum(of temp01-temp11)/11;
    if sum(of i1-i11) > 0 then obs=0;
                          else obs=1;
    output;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  keep obs avg;
run;

proc sort data=perms2;
  by avg;
run;

data perms2;
  set perms2;
  if obs=1 then do;
    pval = 1 - _n_/2048;
    output;
  end;
run;

proc print data = perms2;
     var pval;
     format pval 6.3;
     title 'p-value';
%mend;

%pval;
```

↳ pre-88 difference.

6 p31

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6

diff18_male.lst

Like p1, but MM only

(men only)

Obs	pval
1	0.17

→ xxEW3, p.2, fn4

Quit Ratios for lm smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	[illegible]	0.330
2	Vallejo	intervention	231	0.297
3	Peterborough	comparison	206	0.262
4	Brantford	intervention	213	0.305
5	Davenport	comparison	178	0.264
6	Cedar Rapids	intervention	197	0.351
7	Lowell	comparison	211	0.286
8	Fitchburg/Leominster	intervention	197	0.403
9	Trenton	comparison	203	0.340
10	Patterson	intervention	230	0.331
11	Las Cruces	comparison	235	0.267
12	Sante Fe	intervention	224	0.321
13	New Rochelle	comparison	211	0.319
14	Yonkers	intervention	175	0.300
15	Binghampton/Johnson City	comparison	200	0.278
16	Utica	intervention	193	0.351
17	Greensboro	comparison	192	0.252
18	Raleigh	intervention	235	0.308
19	Albany/Corvallis	comparison	226	0.306
20	Medford/Ashland	intervention	206	0.241
21	Longview/Kelso	comparison	195	0.215
22	Bellingham	intervention	191	0.248

Quit Ratios for h smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	245	0.220
2	Vallejo	intervention	257	0.162
3	Peterborough	comparison	243	0.200
4	Brantford	intervention	300	0.186
5	Davenport	comparison	248	0.172
6	Cedar Rapids	intervention	269	0.177
7	Lowell	comparison	268	0.269
8	Fitchburg/Leominster	intervention	243	0.223
9	Trenton	comparison	253	0.162
10	Patterson	intervention	245	0.175
11	Las Cruces	comparison	266	0.185
12	Sante Fe	intervention	264	0.177
13	New Rochelle	comparison	237	0.236
14	Yonkers	intervention	229	0.270
15	Binghampton/Johnson City	comparison	236	0.200
16	Utica	intervention	258	0.253
17	Greensboro	comparison	261	0.138
18	Raleigh	intervention	276	0.204
19	Albany/Corvallis	comparison	236	0.210
20	Medford/Ashland	intervention	246	0.146
21	Longview/Kelso	comparison	258	0.218
22	Bellingham	intervention	270	0.136

Combined Quit Rates

The MEANS Procedure

Variable	Mean
comparison	0.2495906
intervent	0.2622670

p-value:

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diff18_male.sas

```
*options mprint ls=131 ps=45 compress=yes nocenter nodate nonumber source2 mlogic;  *** screen   ***;
options nofmterr ls=225 ps=80 formdlim = ' ' compress=yes nocenter nodate nonumber source2;  *** landsc
ape6 ***;
*options nofmterr mprint ls=104 ps=74 compress=yes nocenter nodate nonumber source2 mlogic;  *** wide6
     ***;
*options mprint ps=100 ls=132 compress=yes nocenter nodate nonumber source2 mlogic; *** portrait ***;


libname d001103 '/data05a/rjrfalise/COMMIT/001103';
libname end1988 '/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort';
libname eval1989 '/data05a/rjrfalise/COMMIT/001113/1989_Evaluation_Cohort';
libname eval1991 '/data05a/rjrfalise/COMMIT/001113/1991_Evaluation_Cohort';
libname end1993 '/data05a/rjrfalise/COMMIT/001113/1993_Endpoint_Cohort';
libname eval1993 '/data05a/rjrfalise/COMMIT/001113/1993_Evaluation_Cohort';
libname prev1993 '/data05a/rjrfalise/COMMIT/001113/1993_Prevalence_Survey';

%include '/data05a/rjrfalise/COMMIT/001103/commit_endpoint_cohort_data_1988.sasprg';

proc sort data=end1993.endpnt out=endpnt93;
     by comcode seq_id member;

proc sort data=d001103.endpoint_1988(keep=comcode commit) out=commitkey;
     by comcode;

proc sort data=end1988.base88_d(keep=comcode seq_id member statextb)
        out=detail;
  by comcode seq_id member;

proc sort data=end1988.base88_2(keep=comcode seq_id member intrstat statexta sex)
        out=desc2;
  by comcode seq_id member;

data endpnt93;
     merge endpnt93 (in = a keep = seq_id comcode member statbas status93)
     desc2 (in = b keep = comcode seq_id member sex);
     by comcode seq_id member;
     if a = 1;

data prev;
  merge
    detail(in=in1)
    desc2(in=in2);
  by comcode seq_id member;
  if in1;
  if sex = 1;
  citypair = round(comcode/2);
  select(comcode);
    when(2,4,5,8,9,12,13,15,18,19,21) commit=1;
    otherwise                         commit=0;
  end;
run;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1,2,3));
  tables citypair*commit / out=out3a(drop=percent);
run;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1));
  tables citypair*commit / out=out3b(drop=percent);
run;

data weights;
  merge
    out3a(rename=count=n)
    out3b(rename=count=q);
  by citypair commit;
  if commit=0 then control=q/n;
  if commit=1 then treatment=q/n;
  if last.citypair then do;
    std_avg=mean(control,treatment);
    output;
  end;
  retain control treatment;
  drop q n;
run;

data table1;
     merge endpnt93 (in = a keep = seq_id comcode member statbas status93 sex)
     comm (in = b);
     by comcode;
     if a = 1;
     if status93 = 2 then status93 = .;
     if sex = 1;
     if statbas = 1 then heavy = 1;
     if statbas = 2 then heavy = 0;
     status93=-1*status93;
     if status93 = -1 then status93 = 0;
     citypair = round(comcode/2);

%macro quitratio(dose, num);

proc means data = table1 nway noprint;
     where heavy = &num;
     class comcode commit;
     var status93;
     output out=diffs_&dose(rename = (_freq_ = N) mean=quitrate;

data diffs_&dose;
     set diffs_&dose;
     citypair = round(comcode/2);

proc sort data = diffs_&dose;
     by citypair commit;

proc print data = diffs_&dose;
     var comcode commit N quitrate;
     format comcode comcode. quitrate 5.3;
     title 'Quit Ratios for &dose smokers';

proc transpose data = diffs_&dose
          out = diffs_&dose (rename = (col1 = control col2 = treatment));
     var quitrate;
     by citypair;

%mend;

%quitratio(lm,0);
%quitratio(h,1);

** Next, p-val and CI;

data diffs;
  merge
    diffs_lm(rename=(treatment=t_lm
                     control=c_lm))
    diffs_h(rename=(treatment=t_h
                    control=c_h))
    weights;
  by citypair;
  comparison = c_h*control+c_lm*(1-control);
  intervent = t_h*treatment + t_lm*(1-treatment);
  diff = intervent - comparison;
run;

proc means data = diffs mean;
   var comparison intervent;
   title 'Combined Quit Rates';

%macro pval;

data perms;
  set diffs;
  by citypair;
  array diffs (11) diff01 - diff11;
  diffs(citypair) = diff;
  if citypair=11 then output;
  retain diff01 - diff11;
  keep diff01 - diff11;
run;
```

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diff18_male.sas

```
data perms2;
  set perms;
  array diffs (11) diff01 - diff11;
  array temps (11) temp01 - temp11;
  do i1 = 0 to 1;
  do i2 = 0 to 1;
  do i3 = 0 to 1;
  do i4 = 0 to 1;
  do i5 = 0 to 1;
  do i6 = 0 to 1;
  do i7 = 0 to 1;
  do i8 = 0 to 1;
  do i9 = 0 to 1;
  do i10 = 0 to 1;
  do i11 = 0 to 1;
    if i1 = 1 then temps(1) = -diffs(1); else temps(1) = diffs(1);
    if i2 = 1 then temps(2) = -diffs(2); else temps(2) = diffs(2);
    if i3 = 1 then temps(3) = -diffs(3); else temps(3) = diffs(3);
    if i4 = 1 then temps(4) = -diffs(4); else temps(4) = diffs(4);
    if i5 = 1 then temps(5) = -diffs(5); else temps(5) = diffs(5);
    if i6 = 1 then temps(6) = -diffs(6); else temps(6) = diffs(6);
    if i7 = 1 then temps(7) = -diffs(7); else temps(7) = diffs(7);
    if i8 = 1 then temps(8) = -diffs(8); else temps(8) = diffs(8);
    if i9 = 1 then temps(9) = -diffs(9); else temps(9) = diffs(9);
    if i10 = 1 then temps(10) = -diffs(10); else temps(10) = diffs(10);
    if i11 = 1 then temps(11) = -diffs(11); else temps(11) = diffs(11);

    avg = sum(of temp01-temp11)/11;
    if sum(of i1-i11) > 0 then obs=0;
                          else obs=1;
    output;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  keep obs avg;
run;

proc sort data=perms2;
  by avg;
run;

data perms2;
  set perms2;
  if obs=1 then do;
    pval = 1 - _n_/2048;
    output;
  end;
run;

proc print data = perms2;
     var pval;
     format pval 5.2;
     title 'p-value: ';
%mend;

%pval;
```


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diff18_maBC.lst

(BLUE COLLAR men only)

Obs	pval
1	0.18

→ WW3, p.3, fn6

Quit Ratios for lm smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	122	0.275
2	Vallejo	intervention	104	0.265
3	Peterborough	comparison	107	0.160
4	Brantford	intervention	109	0.259
5	Davenport	comparison	86	0.271
6	Cedar Rapids	intervention	97	0.275
7	Lowell	comparison	108	0.328
8	Fitchburg/Leominster	intervention	92	0.456
9	Trenton	comparison	120	0.383
10	Patterson	intervention	148	0.301
11	Las Cruces	comparison	93	0.241
12	Sante Fe	intervention	87	0.276
13	New Rochelle	comparison	106	0.239
14	Yonkers	intervention	82	0.316
15	Binghampton/Johnson City	comparison	88	0.300
16	Utica	intervention	87	0.269
17	Greensboro	comparison	83	0.205
18	Raleigh	intervention	70	0.313
19	Albany/Corvallis	comparison	108	0.281
20	Medford/Ashland	intervention	107	0.258
21	Longview/Kelso	comparison	111	0.217
22	Bellingham	intervention	80	0.226

Blue Collar men only

Likely but Con...

Quit Ratios for h smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	135	0.217
2	Vallejo	intervention	116	0.120
3	Peterborough	comparison	139	0.223
4	Brantford	intervention	182	0.192
5	Davenport	comparison	123	0.174
6	Cedar Rapids	intervention	146	0.151
7	Lowell	comparison	165	0.265
8	Fitchburg/Leominster	intervention	132	0.241
9	Trenton	comparison	149	0.123
10	Patterson	intervention	150	0.194
11	Las Cruces	comparison	78	0.208
12	Sante Fe	intervention	90	0.200
13	New Rochelle	comparison	108	0.250
14	Yonkers	intervention	108	0.257
15	Binghampton/Johnson City	comparison	118	0.208
16	Utica	intervention	133	0.206
17	Greensboro	comparison	104	0.094
18	Raleigh	intervention	80	0.156
19	Albany/Corvallis	comparison	130	0.187
20	Medford/Ashland	intervention	120	0.164
21	Longview/Kelso	comparison	167	0.193
22	Bellingham	intervention	133	0.203

Combined Quit Rates

The MEANS Procedure

Variable	Mean
comparison	0.2352987
intervent	0.2473459

p-value:

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diff18_maBC.sas

```
*options mprint ls=131 ps=45 compress=yes nocenter nodate nonumber source2 mlogic;  *** screen    ***;
options nofmterr ls=225 ps=80 formdlim = ' ' compress=yes nocenter nodate nonumber source2;  *** landsc
ape6 ***;
*options nofmterr mprint ls=104 ps=74 compress=yes nocenter nodate nonumber source2 mlogic;  *** wide6
     ***;
*options mprint ps=100 ls=132 compress=yes nocenter nodate nonumber source2 mlogic;  *** portrait  ***;

libname d001103 '/data05a/rjrfalise/COMMIT/001103';
libname end1988 '/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort';
libname eval1989 '/data05a/rjrfalise/COMMIT/001113/1989_Evaluation_Cohort';
libname eval1991 '/data05a/rjrfalise/COMMIT/001113/1991_Evaluation_Cohort';
libname end1993 '/data05a/rjrfalise/COMMIT/001113/1993_Endpoint_Cohort';
libname eval1993 '/data05a/rjrfalise/COMMIT/001113/1993_Evaluation_Cohort';
libname prev1993 '/data05a/rjrfalise/COMMIT/001113/1993_Prevalence_Survey';

%include '/data05a/rjrfalise/COMMIT/001103/commit_endpoint_cohort_data_1988.sasprg';

proc sort data=end1993.endpnt out=endpnt93;
     by comcode seq_id member;

proc sort data=d001103.endpoint_1988(keep=comcode commit) out=comm nodupkey;
     by comcode;

proc sort data=end1988.base88_d(keep=comcode seq_id member statextb occdesc)
          out=detail;
  by comcode seq_id member;

proc sort data=end1988.base88_2(keep=comcode seq_id member intrstat statexta sex)
          out=desc2;
  by comcode seq_id member;

data endpnt93;
     merge endpnt93 (in = a keep = seq_id comcode member statbas status93)
     desc2 (in = b keep = comcode seq_id member sex)
     detail (in = c);
     by comcode seq_id member;
     if a = 1;

data prev;
  merge
    detail(in=in1)
    desc2(in=in2);
  by comcode seq_id member;
  if in1;
  if sex = 1 and occdesc = 3;
  citypair = round(comcode/2);
  select(comcode);
    when(2,4 5,8,9,12,13,15,18,19,21) commit=1;
    otherwise                         commit=0;
  end;
run;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1,2,3));
  tables citypair*commit / out=out3a(drop=percent);
run;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1));
  tables citypair*commit / out=out3b(drop=percent);
run;

data weights;
  merge
    out3a(rename=count=n)
    out3b(rename=count=q);
  by citypair commit;
  if commit=0 then control=q/n;
  if commit=1 then treatment=q/n;
  if last.citypair then do;
    std_avg=mean(control,treatment);
    output;
  end;
  retain control treatment;
  drop q n;
run;

data table1;
     merge endpnt93 (in = a keep = seq_id comcode member statbas status93 sex occdesc)
     comm (in = b);
     by comcode;
     if a = 1;
     if status93 = 0 then status93 = .;
     if sex = 1 and occdesc = 3;
     if statbas = 1 then heavy = 1;
     if statbas = 2 then heavy = 0;
     status93=-1*status93;
     if status93 = -1 then status93 = 0;
     citypair = round(comcode/2);

%macro quitratio(dose, num);

proc means data = table1 nway noprint;
     where heavy = &num;
     class comcode commit;
     var status93;
     output out=diffs_&dose(rename = (_freq_ = N) mean=quitrate;

data diffs_&dose;
     set diffs_&dose;
     citypair = round(comcode/2);

proc sort data = diffs_&dose;
     by citypair commit;

proc print data = diffs_&dose;
     var comcode commit N quitrate;
     format comcode comcode. quitrate 5.3;
     title "Quit Ratios for &dose smokers";

proc transpose data = diffs_&dose
               out = diffs_&dose (rename = (col1 = control col2 = treatment));
     var quitrate;
     by citypair;

%mend;

%quitratio(lm,0);
%quitratio(h,1);

** Next, p-val and CI;

data diffs;
  merge
    diffs_lm(rename=(treatment=t_lm
                     control=c_lm))
    diffs_h(rename=(treatment=t_h
                     control=c_h))
    weights;
  by citypair;
  comparison = c_h*control+c_lm*(1-control);
  intervent = t_h*treatment + t_lm*(1-treatment);
  diff = intervent - comparison;
run;

proc means data = diffs mean;
   var comparison intervent;
   title 'Combined Quit Rates';

%macro pval;

data perms;
  set diffs;
  by citypair;
  array diffs {11} diff01 - diff11;
  diffs{citypair} = diff;
  if citypair=11 then output;
  retain diff01 - diff11;
  keep diff01 - diff11;
```

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11

diff18_maBC.sas

```
run;

data perms2;
  set perms;
  array diffs (11) diff01 - diff11;
  array temps (11) temp01 - temp11;
  do i1 = 0 to 1;
  do i2 = 0 to 1;
  do i3 = 0 to 1;
  do i4 = 0 to 1;
  do i5 = 0 to 1;
  do i6 = 0 to 1;
  do i7 = 0 to 1;
  do i8 = 0 to 1;
  do i9 = 0 to 1;
  do i10 = 0 to 1;
  do i11 = 0 to 1;
    if i1 = 1 then temps(1) = -diffs(1); else temps(1) = diffs(1);
    if i2 = 1 then temps(2) = -diffs(2); else temps(2) = diffs(2);
    if i3 = 1 then temps(3) = -diffs(3); else temps(3) = diffs(3);
    if i4 = 1 then temps(4) = -diffs(4); else temps(4) = diffs(4);
    if i5 = 1 then temps(5) = -diffs(5); else temps(5) = diffs(5);
    if i6 = 1 then temps(6) = -diffs(6); else temps(6) = diffs(6);
    if i7 = 1 then temps(7) = -diffs(7); else temps(7) = diffs(7);
    if i8 = 1 then temps(8) = -diffs(8); else temps(8) = diffs(8);
    if i9 = 1 then temps(9) = -diffs(9); else temps(9) = diffs(9);
    if i10 = 1 then temps(10) = -diffs(10); else temps(10) = diffs(10);
    if i11 = 1 then temps(11) = -diffs(11); else temps(11) = diffs(11);

    avg = sum(of temp01-temp11)/11;
    if sum(of i1-i11) > 0 then obs=0;
                          else obs=1;
    output;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  keep obs avg;
run;

proc sort data=perms2;
  by avg;
run;

data perms2;
  set perms2;
  if obs=1 then do;
    pval = 1 - _n_/2048;
    output;
  end;
run;

proc print data = perms2;
     var pval;
     format pval 5.2;
     title 'p-value: ';
%mend;

%pval;
```

Harris Report 7 replication
no Pleural effect
using ms8a.lim, ms5lim.lpj

R2_1
GR 1963-2000 3.0 → 1.0
Multiple

R2_r2_r
plus
Int Rate Multiple 1963-2000
0.7 → 1.0

R2_r2_R1_1
plus
GR multiple 1954-1962
1.15 → 1.0

R2_r2_R1_r1_1
plus
Int Rate Multiple 1954-62
0.9 → 1.0

see also tab 62 p.1

(P_D) "probability that past claimant who got a disease in BL will get same or less severe disease in CF (draft, #6, p15)

dataset name/ created by

	LC	DBID	NBID	PL	
LC	0.5033	0.0000	0.0000	0.0000	ms8a.dta /
DBID	0.1397	0.7785	0.0000	0.0000	ms8a.lim
NBID	0.2139	0.1052	0.8638	0.0000	
PL	0.1046	0.0490	0.0904	1.000	

0.8880	0.0000	0.0000	0.0000	ms8a-R2.dta /
0.0365	0.9577	0.0000	0.0000	ms8a-R2.lim
0.0482	0.0217	0.9754	0.0000	(tab 66, p.19)
0.0195	0.0174	0.0160	1.0000	

0.9467	0.0000	0.0000	0.0000	ms8a-R2-r2.dta
0.0177	0.9803	0.0000	0.0000	
0.0229	0.0102	0.9886	0.0000	ms8a-R2-r2.lim
0.0090	0.0080	0.0074	1.0000	(tab 67, p.35)

0.9790	0.0000	0.0000	0.0000	ms8a-R2-r2-R1.dta
0.0070	0.9923	0.0000	0.0000	
0.0090	0.0040	0.9956	0.0000	ms8a-R2-r2-R1.lim
0.0035	0.0031	0.0029	1.0000	(tab 68, p.35)

1.0000	0.0000	0.0000	0.0000	ms8a-R2-r2-R1-r1.dta
0.0000	1.0000	0.0000	0.0000	ms8a-R2-r2-R1-r1.lim
0.0000	0.0000	1.0000	0.0000	
0.0000	0.0000	0.0000	1.0000	(tab 69, p.35)

Harris Report 7 Replication

H, #7, P2

year	Lung Cancer BL	Lung Cancer CF	Disabling BID BL	Disabling BID CF	Non-Disabling BID BL	Non-Disabling BID CF	Pleural Injury BL	Pleural Injury CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	232	18	78	50	143	41	95
1997	852	429	601	587	1165	1252	1024	1278
1998	1408	709	2386	2054	3823	3854	3811	4540
1999	2265	1140	16423	13102	24116	23044	8291	12334
2000	2960	1490	15359	12370	24575	23477	10674	14726
TOTAL	7945	4000	34787	28191	53729	51770	23841	32973
1992	14	7	1	3	0	3	0	2
1993	17	9	2	4	0	4	0	2
1994	555	279	6	82	3	122	0	59
1995	933	470	44	165	30	230	21	126
1996	1612	811	1003	1006	3356	3349	3722	4293
1997	2405	1210	4262	3654	7262	7236	5453	6783
1998	2111	1062	3967	3383	6992	6909	5907	7153
1999	2653	1335	22284	17719	35603	33666	12023	17725
2000	3685	1855	20135	16190	30318	29095	13653	18773
TOTAL	13985	7038	51704	42206	83564	80614	40779	54916
CF - BL		6947		9498		2950		

BL data —> P3, 4, 5, 6

52614 0954

Harris Report 7 Replication
with R2 changed 3.0 to 1.0
(1963–2003 OR multiplier

year	Lung Cancer BL	Lung Cancer CF	Disabling BID BL	Disabling BID CF	Non-Disabling BID BL	Non-Disabling BID CF	Pleural Injury BL	Pleural Injury CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	408	18	34	50	71	41	51
1997	852	757	601	607	1165	1190	1024	1070
1998	1408	1250	2386	2336	3823	3849	3811	3941
1999	2265	2011	16423	15811	24116	23988	8291	9007
2000	2960	2628	15359	14817	24575	24446	10674	11392
TOTAL	7945	7054	34787	33605	53729	53544	23841	25461
1992	14	12	1	1	0	1	0	0
1993	17	15	2	3	0	1	0	0
1994	555	493	6	26	3	30	0	11
1995	933	829	44	76	30	75	21	40
1996	1612	1431	1003	1019	3356	3373	3722	3825
1997	2405	2136	4262	4170	7262	7292	5453	5690
1998	2111	1876	3967	3876	6992	7008	5907	6129
1999	2653	2356	22284	21438	35603	35339	12023	13032
2000	3685	3272	20135	19418	30318	30187	13653	14560
TOTAL	13985	12419	51704	50027	83564	83306	40779	43287
CF - BL		1566		1677		258		

tab 66, p. 25

(BL #'s : see p. 2 this tab

52614 0955

Harris Report 7 Replication
with R2 changed 3 to 1.0
and r2 changed 0.7 to 1.0
(Initiator Ratio multiplier, 1962–2000

year	Lung Cancer BL	Lung Cancer CF	Disabling BID BL	Disabling BID CF	Non-Disabling BID BL	Non-Disabling BID CF	Pleural Injury BL	Pleural Injury CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	435	18	26	50	60	41	46
1997	852	807	601	604	1165	1177	1024	1045
1998	1408	1333	2386	2364	3823	3836	3811	3871
1999	2265	2144	16423	16140	24116	24060	8291	8621
2000	2960	2802	15359	15109	24575	24519	10674	11005
TOTAL	7945	7521	34787	34243	53729	53652	23841	24586
1992	14	13	1	1	0	0	0	0
1993	17	[illegible]	2	2	0	0	0	0
1994	555	525	6	16	3	16	0	5
1995	933	883	44	60	30	51	21	30
1996	1612	1526	1003	1012	3356	3365	3722	3769
1997	2405	2277	4262	4221	7262	7278	5453	5562
1998	2111	[illegible]	3967	3926	6992	7001	5907	6009
1999	2653	2512	22284	21892	35603	35485	12023	12489
2000	3685	[illegible]	20135	19804	30318	30262	13653	14072
TOTAL	13985	[illegible]	51704	50934	83564	83458	40779	41936
CF - BL		746		770		106		

tab 07 p. 41

BL #'s: see p.2 this tab

52614 0956

Harris Report 7 Replication
with R2 changed 3 to 1.0
and r2 changed 0.7 to 1.0
and R1 changed 1.5 to 1.0
L QR multiplier 1954-1962

year	Lung Cancer BL	Lung Cancer CF	Disabling BID BL	Disabling BID CF	Non-Disabling BID BL	Non-Disabling BID CF	Pleural Injury BL	Pleural Injury CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	450	18	21	50	54	41	43
1997	852	834	601	602	1165	1170	1024	1032
1998	1408	1378	2386	2377	3823	3828	3811	3834
1999	2265	2217	16423	16312	24116	24096	8291	8420
2000	2960	2898	15359	15261	24575	24555	10674	10803
TOTAL	7945	7777	34787	34573	53729	53703	23841	24132
1992	14	14	1	1	0	0	0	0
1993	17	17	2	2	0	0	0	0
1994	555	543	6	10	3	8	0	2
1995	933	9[illegible]3	44	50	30	38	21	24
1996	1612	1578	1003	1007	3356	3360	3722	3740
1997	2405	23[illegible]	4262	4246	7262	7269	5453	5496
1998	2111	2067	3967	3951	6992	6996	5907	5947
1999	2653	25[illegible]	22284	22131	35603	35559	12023	12205
2000	3685	36[illegible]	20135	20006	30318	30298	13653	13816
TOTAL	13985	13[illegible]	51704	51404	83564	83528	40779	41230
CF - BL		294		300		36		

tab 68 p.41

BL #'s : see p.2 this tab

52614 0957

Harris Report 7 Replication
with R2 changed 3 to 1.0
and r2 changed 0.7 to 1.0
and R1 changed 1.5 to 1.0
and r1 changed 0.9 to 1.0
Initiation Rate multiples 1954–1962

year	Lung Cancer BL	Lung Cancer CF	Disabling BID BL	Disabling BID CF	Non-Disabling BID BL	Non-Disabling BID CF	Pleural Injury BL	Pleural Injury CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	460	18	18	50	50	41	41
1997	852	852	601	601	1165	1165	1024	1024
1998	1408	1408	2386	2386	3823	3823	3811	3811
1999	2265	2265	16423	16423	24116	24116	8291	8291
2000	2960	2960	15359	15359	24575	24575	10674	10674
TOTAL	7945	7945	34787	34787	53729	53729	23841	23841
1992	14	14	1	1	0	0	0	0
1993	17	17	2	2	0	0	0	0
1994	555	555	6	6	3	3	0	0
1995	933	933	44	44	30	30	21	21
1996	1612	1612	1003	1003	3356	3356	3722	3722
1997	2405	2405	4262	4262	7262	7262	5453	5453
1998	2111	2111	3967	3967	6992	6992	5907	5907
1999	2653	2653	22284	22284	35603	35603	12023	12023
2000	3685	3685	20135	20135	30318	30318	13653	13653
TOTAL	13985	13985	51704	51704	83564	83564	40779	40779
CF - BL		0		0		0		

tab 69 p. 41

BL #'s : see p.2 this tab

52614 0958

diff18a.lst

Obs	pval
1	0.07

Disclosed

Quit Ratios for lm smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	[illegible]	0.154
2	Vallejo	intervention	504	0.159
3	Peterborough	comparison	453	0.199
4	Brantford	intervention	475	0.219
5	Davenport	comparison	448	0.185
6	Cedar Rapids	intervention	443	0.233
7	Lowell	comparison	475	0.189
8	Fitchburg/Leominster	intervention	463	0.210
9	Trenton	comparison	472	0.184
10	Patterson	intervention	473	0.161
11	Las Cruces	comparison	482	0.185
12	Sante Fe	intervention	470	0.202
13	New Rochelle	comparison	475	0.206
14	Yonkers	intervention	463	0.210
15	Binghampton/Johnson City	comparison	464	0.185
16	Utica	intervention	473	0.245
17	Greensboro	comparison	456	0.169
18	Raleigh	intervention	492	0.189
19	Albany/Corvallis	comparison	467	0.167
20	Medford/Ashland	intervention	479	0.167
21	Longview/Kelso	comparison	440	0.159
22	Bellingham	intervention	442	0.188

Quit Ratios for h smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	435	0.133
2	Vallejo	intervention	442	0.090
3	Peterborough	comparison	489	0.153
4	Brantford	intervention	531	0.126
5	Davenport	comparison	464	0.119
6	Cedar Rapids	intervention	475	0.135
7	Lowell	comparison	497	0.161
8	Fitchburg/Leominster	intervention	428	0.138
9	Trenton	comparison	458	0.096
10	Patterson	intervention	440	0.093
11	Las Cruces	comparison	454	0.134
12	Sante Fe	intervention	450	0.120
13	New Rochelle	comparison	451	0.153
[illegible]	[illegible]	intervention	432	0.169
15	[illegible]ampton/[illegible]son City	comparison	434	0.118
16	Utica	intervention	455	0.154
17	Greensboro	comparison	462	0.089
18	Raleigh	intervention	455	0.156
19	Albany/Corvallis	comparison	451	0.118
20	Medford/Ashland	intervention	426	0.096
21	Longview/Kelso	comparison	448	0.136
22	Bellingham	intervention	442	0.106

Combined Quit Rates

The MEANS Procedure

Variable	Mean
comparison	0.1607752
intervent	0.1715897

$\Delta = .011$

p-value:

E-7

BEST COPY

52614 0959

diff18a.sas

```
*options mprint ls=131 ps=45 compress=yes nocenter nodate nonumber source2 mlogic;  *** screen     ***;
options nofmterr ls=225 ps=80 formdlim = ' ' compress=yes nocenter nodate nonumber source2;  *** landsc
ape6 ***;
*options nofmterr mprint ls=104 ps=74 compress=yes nocenter nodate nonumber source2 mlogic;  *** 2Ude6
     ***;
*options mprint ps=100 ls=132 compress=yes nocenter nodate nonumber source2 mlogic  *** portrait6  ***;


libname d001103 '/data05a/rjrfalise/COMMIT/001103';
libname end1988 '/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort';
libname eval1989 '/data05a/rjrfalise/COMMIT/001113/1989_Evaluation_Cohort';
libname eval1991 '/data05a/rjrfalise/COMMIT/001113/1991_Evaluation_Cohort';
libname end1993 '/data05a/rjrfalise/COMMIT/001113/1993_Endpoint_Cohort';
libname eval1993 '/data05a/rjrfalise/COMMIT/001113/1993_Evaluation_Cohort';
libname prev1993 '/data05a/rjrfalise/COMMIT/001113/1993_Prevalence_Survey';

%include '/data05a/rjrfalise/COMMIT/001103/commit_endpoint_cohort_data_1988.sasprg';

proc sort data=end1993.endpnt out=endpnt93;
     by comcode seq_id member;

proc sort data=d001103.endpoint_1988(keep=comcode commit) out=comm nodupkey;
     by comcode;

proc sort data=end1988.base88_d(keep=comcode seq_id member statextb)
          out=detail;
  by comcode seq_id member;

proc sort data=end1988.base88_2(keep=comcode seq_id member intrstat statexta sex)
          out=desc2;
  by comcode seq_id member;

data endpnt93;
     merge endpnt93 (in = a keep = seq_id comcode member statbas status93)
     desc2 (in = b keep = comcode seq_id member sex);
     by comcode seq_id member;
     if a = 1;

data prev;
  merge
    detail(in=in1)
    desc2(in=in2);
  by comcode seq_id member;
  if in1;
*  if sex = 1;
  citypair = round(comcode/2);
  select(comcode);
    when(2,4,5,8,9,12,13,15,18,19,21) commit=1;
    otherwise                         commit=0;
  end;
run;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1,2,3));
  tables citypair*commit / out=out3a(drop=percent);
run;

proc freq data=prev noprint;
  where(intrstat=1 & statextb in (1));
  tables citypair*commit / out=out3b(drop=percent);
run;

data weights;
  merge
    out3a(rename=count=n)
    out3b(rename=count=q);
  by citypair commit;
  if commit=0 then control=q/n;
  if commit=1 then treatment=q/n;
  if last.citypair then do;
    std_avg=mean(control,treatment);
    output;
  end;
  retain control treatment;
  drop q n;
run;

data table1;
     merge endpnt93 (in = a keep = seq_id comcode member statbas status93*sex)
     comm (in = b);
     by comcode;
     if a=1;
     if sex = 1;
     if statbas = 1 then heavy = 1;
     if statbas = 2 then heavy = 0;
     status93=-1*status93;
     if status93 = -1 then status93 = 0;
     citypair = round(comcode/2);

%macro quitratio(dose, num);

proc means data = table1 nway noprint;
     where heavy = &num;
     class comcode commit;
     var status93;
     output out=diffs_&dose (rename = (_freq_ = N) mean=quitrate;

data diffs_&dose;
     set diffs_&dose;
     citypair = round(comcode/2);

proc sort data = diffs_&dose;
     by citypair commit;

proc print data = diffs_&dose;
     var comcode commit N quitrate;
     format comcode comcode. quitrate 5.3;
     title 'Quit Ratios for &dose smokers';

proc transpose data = diffs_&dose
               out = diffs_&dose (rename = (col1 = control col2 = treatment));
     var quitrate;
     by citypair;

%mend;

%quitratio(lm,0);
%quitratio(h,1);

** Next, p-val and CI;

data diffs;
  merge
    diffs_lm(rename=(treatment=t_lm
                     control=c_lm))
    diffs_h(rename=(treatment=t_h
                    control=c_h))
    weights;
  by citypair;
  comparison = c_h*control+c_lm*(1-control);
  intervent = t_h*treatment + t_lm*(1-treatment);
  diff = intervent - comparison;
run;

proc means data = diffs mean;
   var comparison intervent;
   title 'Combined Quit Rates';

%macro pval;

data perms;
  set diffs;
  by citypair;
  array diffs (11) diff01 - diff11;
  diffs(citypair) = diff;
  if citypair=11 then output;
  retain diff01 - diff11;
  keep diff01 - diff11;
run;
```


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diff18a.sas

```
data perms2;
  set perms;
  array diffs (11) diff01 - diff11;
  array temps (11) temp01 - temp11;
  do i1 = 0 to 1;
  do i2 = 0 to 1;
  do i3 = 0 to 1;
  do i4 = 0 to 1;
  do i5 = 0 to 1;
  do i6 = 0 to 1;
  do i7 = 0 to 1;
  do i8 = 0 to 1;
  do i9 = 0 to 1;
  do i10 = 0 to 1;
  do i11 = 0 to 1;
    if i1 = 1 then temps(1) = -diffs(1); else temps(1) = diffs(1);
    if i2 = 1 then temps(2) = -diffs(2); else temps(2) = diffs(2);
    if i3 = 1 then temps(3) = -diffs(3); else temps(3) = diffs(3);
    if i4 = 1 then temps(4) = -diffs(4); else temps(4) = diffs(4);
    if i5 = 1 then temps(5) = -diffs(5); else temps(5) = diffs(5);
    if i6 = 1 then temps(6) = -diffs(6); else temps(6) = diffs(6);
    if i7 = 1 then temps(7) = -diffs(7); else temps(7) = diffs(7);
    if i8 = 1 then temps(8) = -diffs(8); else temps(8) = diffs(8);
    if i9 = 1 then temps(9) = -diffs(9); else temps(9) = diffs(9);
    if i10 = 1 then temps(10) = -diffs(10); else temps(10) = diffs(10);
    if i11 = 1 then temps(11) = -diffs(11); else temps(11) = diffs(11);

    avg = sum(of temp01-temp11)/11;
    if sum(of i1-i11) > 0 then obs=0;
                          else obs=1;
    output;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  end;
  keep obs avg;
run;

proc sort data=perms2;
  by avg;
run;

data perms2;
  set perms2;
  if obs=1 then do;
    pval = 1 - _n_/2048;
    output;
  end;
run;

proc print data = perms2;
     var pval;
     format pval 5.2;
     title 'p-value: ';
%mend;


%pval;
```


52614 0961

89eval.lst

Non-missing — a question — occupation

Disagree 12/[illegible]

Question	Gender	Occupation	Total	# Agree	% Agree	# Disagree	% Disagree	# Likely	% Likely	# Unlikely	% Unlikely	# Yes	% Yes	# No	% No
i2_23p1	.	.	2,936	1,970	67.1%	966	32.9%	.	.	.	.	.	.	.	.
i2_23p1	.	Professional	959	632	[illegible]	[illegible]	[illegible]	.	.	.	.	.	.	.	.
i2_23p1	.	Clerical/Sales	776	523	[illegible]	253	[illegible]	.	.	.	.	.	.	.	.
i2_23p1	.	Blue Collar	1,201	815	[illegible]	386	[illegible]	.	.	.	.	.	.	.	.
i2_23p1	Male	.	1,638	1,079	[illegible]	559	[illegible]	.	.	.	.	.	.	.	.
i2_23p1	Female	.	1,298	891	[illegible]	407	31.4%	.	.	.	.	.	.	.	.
i2_23p1	Male	Professional	518	338	65.3%	180	34.7%	.	.	.	.	.	.	.	.
i2_23p1	Male	Clerical/Sales	310	214	69.0%	96	31.0%	.	.	.	.	.	.	.	.
i2_23p1	Male	Blue Collar	810	527	65.1%	283	34.9%	.	.	.	.	.	.	.	.
i2_23p1	Female	Professional	441	294	66.7%	147	33.3%	.	.	.	.	.	.	.	.
i2_23p1	Female	Clerical/Sales	466	309	66.3%	157	33.7%	.	.	.	.	.	.	.	.
i2_23p1	Female	Blue Collar	391	288	73.7%	103	26.3%	.	.	.	.	.	.	.	.
i2_24p1	.	.	2,812	947	33.7%	1,865	66.3%	.	.	.	.	.	.	.	.
i2_24p1	.	Professional	915	300	32.8%	615	67.2%	.	.	.	.	.	.	.	.
i2_24p1	.	Clerical/Sales	759	254	33.5%	505	66.5%	.	.	.	.	.	.	.	.
i2_24p1	.	Blue Collar	1,138	393	34.5%	745	65.5%	.	.	.	.	.	.	.	.
i2_24p1	Male	.	1,521	540	35.5%	981	64.[illegible]	.	.	.	.	.	.	.	.
i2_24p1	Female	.	1,291	407	31.5%	884	68.[illegible]	.	.	.	.	.	.	.	.
i2_24p1	Male	Professional	481	169	35.1%	312	64.[illegible]	.	.	.	.	.	.	.	.
i2_24p1	Male	Clerical/Sales	294	115	39.1%	179	60.[illegible]	.	.	.	.	.	.	.	.
i2_24p1	Male	Blue Collar	746	256	34.3%	490	65.[illegible]	.	.	.	.	.	.	.	.
i2_24p1	Female	Professional	434	131	30.2%	303	69.8%	.	.	.	.	.	.	.	.
i2_24p1	Female	Clerical/Sales	465	139	29.9%	326	70.1%	.	.	.	.	.	.	.	.
i2_24p1	Female	Blue Collar	392	137	34.9%	255	65.1%	.	.	.	.	.	.	.	.
i2_26p1	.	.	2,878	1,877	65.2%	1,001	34.8%	.	.	.	.	.	.	.	.
i2_26p1	.	Professional	950	668	70.3%	282	29.7%	.	.	.	.	.	.	.	.
i2_26p1	.	Clerical/Sales	776	504	64.9%	272	35.1%	.	.	.	.	.	.	.	.
i2_26p1	.	Blue Collar	1,152	705	61.2%	447	38.8%	.	.	.	.	.	.	.	.
i2_26p1	Male	.	1,586	1,007	63.5%	579	36.5%	.	.	.	.	.	.	.	.
i2_26p1	Female	.	1,292	870	67.3%	422	32.7%	.	.	.	.	.	.	.	.
i2_26p1	Male	Professional	503	348	69.2%	155	30.8%	.	.	.	.	.	.	.	.
i2_26p1	Male	Clerical/Sales	313	197	62.9%	116	37.1%	.	.	.	.	.	.	.	.
i2_26p1	Male	Blue Collar	770	462	60.0%	308	40.0%	.	.	.	.	.	.	.	.
i2_26p1	Female	Professional	447	320	71.6%	127	28.4%	.	.	.	.	.	.	.	.
i2_26p1	Female	Clerical/Sales	463	307	66.3%	156	33.7%	.	.	.	.	.	.	.	.
i2_26p1	Female	Blue Collar	382	243	63.6%	139	36.4%	.	.	.	.	.	.	.	.
i2_29	.	.	3,034	.	.	.	.	2,390	78.8%	644	21.2%	.	.	.	.
i2_29	.	Professional	997	.	.	.	.	772	77.4%	225	22.6%	.	.	.	.
i2_29	.	Clerical/Sales	810	.	.	.	.	645	79.6%	165	20.4%	.	.	.	.
i2_29	.	Blue Collar	1,227	.	.	.	.	973	79.3%	254	20.7%	.	.	.	.
i2_29	Male	.	1,668	.	.	.	.	1,320	79.1%	348	20.9%	.	.	.	.
i2_29	Female	.	1,366	.	.	.	.	1,070	78.3%	296	21.7%	.	.	.	.
i2_29	Male	Professional	531	.	.	.	.	402	75.7%	129	24.3%	.	.	.	.
i2_29	Male	Clerical/Sales	319	.	.	.	.	263	82.4%	56	17.6%	.	.	.	.
i2_29	Male	Blue Collar	818	.	.	.	.	655	80.1%	163	19.9%	.	.	.	.
i2_29	Female	Professional	466	.	.	.	.	370	79.4%	96	20.6%	.	.	.	.
i2_29	Female	Clerical/Sales	491	.	.	.	.	[illegible]82	77.8%	109	22.2%	.	.	.	.
i2_29	[illegible]	Blue Collar	409	.	.	.	.	31[illegible]	77.[illegible]	91	22.2%	.	.	.	.
i2_[illegible]	.	.	3,052	.	.	.	.	.	.	.	.	[illegible],689	55.[illegible]	1,363	44.7%
i2_[illegible]	.	Professional	1,007	.	.	.	.	.	.	.	.	527	52.3%	480	47.[illegible]
i2_30	.	Clerical/Sales	805	.	.	.	.	.	.	.	.	435	54.0%	370	46.0%
i2_30	.	Blue Collar	1,240	.	.	.	.	.	.	.	.	727	58.6%	513	41.4%
i2_30	Male	.	1,687	.	.	.	.	.	.	.	.	1,013	60.0%	674	40.0%
i2_30	Female	.	1,365	.	.	.	.	.	.	.	.	676	49.5%	689	50.5%
i2_30	Male	Professional	539	.	.	.	.	.	.	.	.	301	55.8%	238	44.2%
i2_30	Male	Clerical/Sales	317	.	.	.	.	.	.	.	.	191	60.3%	126	39.7%
i2_30	Male	Blue Collar	831	.	.	.	.	.	.	.	.	521	62.7%	310	37.3%
i2_30	Female	Professional	468	.	.	.	.	.	.	.	.	226	48.3%	242	51.7%
i2_30	Female	Clerical/Sales	488	.	.	.	.	.	.	.	.	244	50.0%	244	50.0%
i2_30	Female	Blue Collar	409	.	.	.	.	.	.	.	.	206	50.4%	203	49.6%

52614 0962

89eval.sas

```
libname eval1989 '/data05a/rjrfalise/COMMIT/0[illegible]_Evaluation_Cohort';

options nocenter nodate nonumber;

******************************************************;
* PROC FORMAT - create formats for analysis variables ;
******************************************************;

proc format library=work;
     value sex 1='Male'
               2='Female';
     value occupation 1='Professional'
                      2='Clerical/Sales'
                      3='Blue Collar';
     value agree 1='Agree'
                 2='Disagree';
     value likely 1-2='Likely'
                  3-4='Unlikely';
     value yes 1='Yes'
               2='No';
quit;

*****************************************************************************;
* AGREE macro - calculate metrics for variables formatted using the agree format ;
*****************************************************************************;

%macro agree(invar);

proc sort data=eval1989.eval89 (where=((sex in (1,2)) and
                                       (i4_9b in (1,2,3)) and
                                       (i1_6=1) and
                                       (&invar in (1,2))))

         out=&invar;
     by sex i4_9b;
quit;

proc freq data=&invar;
     by sex i4_9b;
     tables &invar / missing
                     noprint
                     out=&invar (drop=percent);
     format sex sex.
            i4_9b occupation.
            &invar agree.;
quit;

proc transpose data=&invar
               out=&invar (drop=_LABEL_ _NAME_);
     by sex i4_9b;
     var count;
     id &invar;
quit;

proc summary data=&invar;
     class sex i4_9b;
     var agree disagree;
     output out=&invar (drop=_FREQ_ _TYPE_)
            sum=agree disagree;
quit;

data &invar;
     set &invar;

     label sex='Gender'
           i4_9b='Occupation';

     format agree comma5.0;
     label agree='#*Agree';

     format disagree comma5.0;
     label disagree='#*Disagree';

     length total 8.;
     total=sum(agree,disagree);

     length agree_pct 8.;
     format agree_pct percent7.1;
     label agree_pct='%*Agree';
     agree_pct=agree/total;

     length disagree_pct 8.;
     format disagree_pct percent7.1;
     label disagree_pct='%*Disagree';
     disagree_pct=disagree/total;

     length question $ 8;
     label question='Question';
     question="&invar";

run;

%mend agree;

%agree(i2_23p1);
%agree(i2_24p1);
%agree(i2_26p1);

*******************************************************************************;
* LIKELY macro - calculate metrics for variables formatted using the likely format ;
*******************************************************************************;

%macro likely(invar);

proc sort data=eval1989.eval89 (where=((sex in (1,2)) and
                                       (i4_9b in (1,2,3)) and
                                       (i1_6=1) and
                                       (&invar in (1,2,3,4))))

         out=&invar;
     by sex i4_9b;
quit;

proc freq data=&invar;
     by sex i4_9b;
     tables &invar / missing
                     noprint
                     out=&invar (drop=percent);
     format sex sex.
            i4_9b occupation.
            &invar likely.;
quit;

proc transpose data=&invar
               out=&invar (drop=_LABEL_ _NAME_);
     by sex i4_9b;
     var count;
     id &invar;
quit;

proc summary data=&invar;
     class sex i4_9b;
     var likely unlikely;
     output out=&invar (drop=_FREQ_ _TYPE_)
            sum=likely unlikely;
quit;

data &invar;
     set &invar;

     label sex='Gender'
           i4_9b='Occupation';

     format likely comma5.0;
     label likely='#*Likely';

     format unlikely comma5.0;
     label unlikely='#*Unlikely';
```

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89eval.sas

```
     format total comma5.0;
     label total='Total';
     total=sum(likely,unlikely);

     length likely_pct 8.;
     format likely_pct percent7.1;
     label likely_pct='%*Likely';
     likely_pct=likely/total;

     length unlikely_pct 8.;
     format unlikely_pct percent7.1;
     label unlikely_pct='%*Unlikely';
     unlikely_pct=unlikely/total;

     length question $ 8;
     label question='Question';
     question="&invar";

run;

%mend  likely;

%likely(i2_29);

*********************************************************************;
* YES macro - calculate metrics for variables formatted using the yes format ;
*********************************************************************;

%macro yes(invar);

proc sort data=eval1989.eval89 (where=((sex in (1,2)) and
                                (i4_9b in (1,2,3)) and
                                (i1_6=1) and
                                (&invar in (1,2))))
          out=&invar;
     by sex i4_9b;
quit;

proc freq data=&invar;
     by sex i4_9b;
     tables &invar / missing
                     noprint
                     out=&invar (drop=percent);
     format sex sex.
            i4_9b occupation.
            &invar yes.;
quit;

proc transpose data=&invar
               out=&invar (drop=_LABEL_ _NAME_);
     by sex i4_9b;
     var count;
     id &invar;
quit;

proc summary data=&invar;
     class sex i4_9b;
     var yes no;
     output out=&invar (drop=_FREQ_ _TYPE_)
            sum=yes no;
quit;

data &invar;
     set &invar;

     label sex='Gender'
           i4_9b='Occupation';

     format yes comma5.0;
     label yes='#*Yes';

     format no comma5.0;
     label no='#*No';

     length total 8.;

     format total comma5.0;
     label total='Total';
     total=sum(yes,no);

     length yes_pct 8.;
     format yes_pct percent7.1;
     label yes_pct='%*Yes';
     yes_pct=yes/total;

     length no_pct 8.;
     format no_pct percent7.1;
     label no_pct='%*No';
     no_pct=no/total;

     length question $ 8;
     label question='Question';
     question="&invar";

run;

%mend  yes;

%yes(i2_30);

*********************************************************************;
* DATFILE - combine datasets generated by macros and print ;
*********************************************************************;

filename outfile '/home/rjrfalis/sac/11_29_00/89eval/89eval.tsv' lrecl=3000;

data datfile;
     set i2_23p1
         i2_24p1
         i2_26p1
         i2_29
         i2_30;

     file outfile;
     put question '~'
         sex '~'
         i4_9b '~'
         total '~'
         agree '~'
         agree_pct '~'
         disagree '~'
         disagree_pct '~'
         likely '~'
         likely_pct '~'
         unlikely '~'
         unlikely_pct '~'
         yes '~'
         yes_pct '~'
         no '~'
         no_pct '~';

run;

proc print data=datfile
           label
           noobs
           split='*'
           uniform;
     var question sex i4_9b total agree agree_pct disagree disagree_pct
                                  likely likely_pct unlikely unlikely_pct
                                  yes yes_pct no no_pct;
quit;

*********;
* ENDSAS ;
*********;

endsas;
```

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05/26/89

COMMIT

Evaluation Survey

Draft Instrument #14

05/26/89 Version

2.19a From whom?

		YES	NO
a.	Your children	1	2
b.	Other family members	1	2
c.	Your friends	1	2
d.	Your physician or other health care personnel	1	2
e.	Your co-workers	1	2

*** SEE NOTE AT BEGINNING OF PART 2 ***

		AGREE	DISAGREE (P1)	STRONGLY	SOMEWHAT (P2)
2.20	The smoke from someone else's cigarette is harmful to a nonsmoker	1	2	1	2
2.21	Inhaling smoke from someone else's cigarette causes lung cancer in a non-smoker.	1	2	1	2
2.22	Moderate use of cigarettes is less harmful than moderate use of alcoholic beverages.	1	2	1	2
2.23	Air pollution is a greater health risk than cigarettes.	1	2	1	2
2.24	Smoking cigarettes is less harmful than being 20 pounds overweight.	1	2	1	2
2.25	This year far more people will die as a result of cigarette smoking than from cocaine.	1	2	1	2
2.26	Smoking low-tar cigarettes is safer than smoking high-tar cigarettes.	1	2	1	2
2.27	If a person has smoked for more than 20 years, there is little health benefit to quitting.	1	2	1	2
2.28	The evidence that tobacco smoke is dangerous to the health of a non-smoker is exaggerated.	1	2	1	2

(IF THE ANSWER TO 1.6 IS 2, GO TO PART 3 QUESTION 2, ELSE GO TO 2.29)

2.29 How likely do you think it is that you will have serious health problems from smoking if you continue to smoke? Do you think it is ...

Very likely 1
Likely, ...2
Unlikely, or. 3
Very unlikely,. 4

2.30 Do you think that your smoking has already affected your health?

YES 1
NO. 2

2.31 How likely do you think it is that you will avoid or decrease serious health problems from smoking if you quit? Do you think it is ...

Very likely 1
Likely, ...2
Unlikely, or. 3
Very unlikely,. 4

NOTE: GO TO PART 3

WINSTON & STRAWN

NEW YORK TRIAL SITE

33 Maiden Lane
7th Floor
New York, NY 10038

917-544-9461

Facsimile: 212-487-9524

December 12, 2000

BY HAND DELIVERY

Chad Marlow, Esq.
Orrick, Herrington & Sutcliffe LLP
166 Montague Street
Brooklyn, NY 11201

Re: Falise v. American Tobacco Co., Case No. 99 CV 7392 (JBW)

Dear Chad:

In connection with Dr. Wecker's upcoming testimony, attached please find a disk containing COMMIT reliance data.

Sincerely,

Ricardo E. Ugarte

Ricardo E. Ugarte

Enclosure

cc: Joint Defense Counsel (by hand w/o enclosure)

Wecker
EXHIBIT NO. 6
12-13-00
GINA GLANTZ

52614 0968

1

Quit Ratios for lm smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	519	0.154
2	Vallejo	intervention	504	0.159
3	Peterborough	comparison	453	0.199
4	Brantford	intervention	475	0.219
5	Davenport	comparison	448	0.185
6	Cedar Rapids	intervention	443	0.233
7	Lowell	comparison	475	0.189
8	Fitchburg/Leominster	intervention	463	0.210
9	Trenton	comparison	472	0.184
10	Patterson	intervention	473	0.161
11	Las Cruces	comparison	482	0.185
12	Sante Fe	intervention	470	0.202
13	New Rochelle	comparison	475	0.206
14	Yonkers	intervention	463	0.210
15	Binghampton/Johnson City	comparison	464	0.185
16	Utica	intervention	473	0.245
17	Greensboro	comparison	456	0.169
18	Raleigh	intervention	492	0.189
19	Albany/Corvallis	comparison	467	0.167
20	Medford/Ashland	intervention	479	0.167
21	Longview/Kelso	comparison	440	0.159
22	Bellingham	intervention	442	0.188

Quit Ratios for h smokers

Obs	COMCODE	COMMIT	N	quitrate
1	Hayward	comparison	435	0.133
2	Vallejo	intervention	442	0.090
3	Peterborough	comparison	489	0.153
4	Brantford	intervention	531	0.126
5	Davenport	comparison	464	0.119
6	Cedar Rapids	intervention	475	0.135
7	Lowell	comparison	497	0.161
8	Fitchburg/Leominster	intervention	428	0.138
9	Trenton	comparison	458	0.096
10	Patterson	intervention	440	0.093
11	Las Cruces	comparison	454	0.134
12	Sante Fe	intervention	450	0.120
13	New Rochelle	comparison	451	0.153
14	Yonkers	intervention	432	0.169
15	Binghampton/Johnson City	comparison	434	0.118
16	Utica	intervention	455	0.154
17	Greensboro	comparison	462	0.089
18	Raleigh	intervention	455	0.156
19	Albany/Corvallis	comparison	451	0.118
20	Medford/Ashland	intervention	426	0.096
21	Longview/Kelso	comparison	448	0.136
22	Bellingham	intervention	442	0.106

Combined Quit Rates

The MEANS Procedure

Variable	Mean
comparison	0.1607752
intervent	0.1715897

p-value:

Obs	pval
1	0.07

(2)

```
*options mprint ls=131 ps=45 compress=yes nocenter nodate nonumber
source2 mlogic;  *** screen     ***;
options nofmterr ls=225 ps=80 formdlim = ' ' compress=yes nocenter
nodate nonumber source2;  *** landscape6 ***;
*options nofmterr mprint ls=104 ps=74 compress=yes nocenter nodate
nonumber source2 mlogic;  *** 2wide6     ***;
*options mprint ps=100 ls=132 compress=yes nocenter nodate nonumber
source2 mlogic; *** portrait6  ***;

libname d001103 '/data05a/rjrfalise/COMMIT/001103';
libname end1988 '/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort';
libname eval1989 '/data05a/rjrfalise/COMMIT/001113/1989
_Evaluation_Cohort';
libname eval1991 '/data05a/rjrfalise/COMMIT/001113/1991
_Evaluation_Cohort';
libname end1993 '/data05a/rjrfalise/COMMIT/001113/1993_Endpoint_Cohort';
libname eval1993 '/data05a/rjrfalise/COMMIT/001113/1993
_Evaluation_Cohort';
libname prev1993 '/data05a/rjrfalise/COMMIT/001113/1993
_Prevalence_Survey';

%include
'/data05a/rjrfalise/COMMIT/001103/commit_endpoint_cohort_data_1988.sas
prg';

proc sort data=end1993.endpnt out=endpnt93;
        by comcode seq_id member;

proc sort data=d001103.endpoint_1988(keep=comcode commit) out=comm
nodupkey;
        by comcode;

proc sort data=end1988.base88_d(keep=comcode seq_id member statextb)
            out=detail1;
    by comcode seq_id member;

proc sort data=end1988.base88_2(keep=comcode seq_id member intrstat
statexta sex)
            out=desc2;
    by comcode seq_id member;

data endpnt93;
        merge endpnt93 (in = a keep = seq_id comcode member statbas
status93)
        desc2 (in = b keep = comcode seq_id member sex);
        by comcode seq_id member;
        if a = 1;

data prev;
    merge
      detail(in=in1)
      desc2(in=in2);
    by comcode seq_id member;
    if in1;
*   if sex = 1;
    citypair = round(comcode/2);
    select(comcode);
      when(2,4,5,8,9,12,13,15,18,19,21) commit=1;
      otherwise                         commit=0;
    end;
run;
```

```
proc freq data=prev noprint;
    where(intrstat=1 & statextb in (1,2,3));
    tables citypair*commit / out=out3a(drop=percent);
run;

proc freq data=prev noprint;
    where(intrstat=1 & statextb in (1));
    tables citypair*commit / out=out3b(drop=percent);
run;

data weights;
    merge
      out3a(rename=count=n)
      out3b(rename=count=q);
    by citypair commit;
    if commit=0 then control=q/n;
    if commit=1 then treatment=q/n;
    if last.citypair then do;
      std_avg=mean(control,treatment);
      output;
    end;
    retain control treatment;
    drop q n;
run;

data table1;
       merge endpnt93 (in = a keep = seq_id comcode member statbas
status93 sex)
       comm (in = b);
       by comcode;
       if a = 1;
     if sex = 1;
       if statbas = 1 then heavy = 1;
       if statbas = 2 then heavy = 0;
       status93 = -1*status93;
       if status93 = -1 then status93 = 0;
       citypair = round(comcode/2);

%macro quitratio(dose, num);

proc means data = table1 nway noprint;
       where heavy = &num;
       class comcode commit;
       var status93;
       output out=diffs_&dose(rename = _freq_ = N) mean=quitrate;

data diffs_&dose;
       set diffs_&dose;
       citypair = round(comcode/2);

proc sort data = diffs_&dose;
       by citypair commit;

proc print data = diffs_&dose;
       var comcode commit N quitrate;
       format comcode comcode. quitrate 5.3;
       title "Quit Ratios for &dose smokers";

proc transpose data = diffs_&dose
                    out = diffs_&dose (rename = (col1 = control col2 =
```

```
treatment));
       var quitrate;
       by citypair;

%mend;

%quitratio(lm,0);
%quitratio(h,1);

** Next, p-val and CI;

data diffs;
    merge
      diffs_lm(rename=(treatment=t_lm
                       control=c_lm))
      diffs_h(rename=(treatment=t_h
                       control=c_h))
      weights;
    by citypair;
    comparison = c_h*control+c_lm*(1-control);
    intervent = t_h*treatment + t_lm*(1-treatment);
    diff = intervent - comparison;
run;

proc means data = diffs mean;
     var comparison intervent;
     title 'Combined Quit Rates';

%macro pval;

data perms;
    set diffs;
    by citypair;
    array diffs {11} diff01 - diff11;
    diffs{citypair} = diff;
    if citypair=11 then output;
    retain diff01 - diff11;
    keep diff01 - diff11;
run;

data perms2;
    set perms;
    array diffs {11} diff01 - diff11;
    array temps {11} temp01 - temp11;
    do i1 = 0 to 1;
    do i2 = 0 to 1;
    do i3 = 0 to 1;
    do i4 = 0 to 1;
    do i5 = 0 to 1;
    do i6 = 0 to 1;
    do i7 = 0 to 1;
    do i8 = 0 to 1;
    do i9 = 0 to 1;
    do i10 = 0 to 1;
    do i11 = 0 to 1;
      if i1 = 1 then temps{1} = -diffs{1}; else temps{1} = diffs{1};
      if i2 = 1 then temps{2} = -diffs{2}; else temps{2} = diffs{2};
      if i3 = 1 then temps{3} = -diffs{3}; else temps{3} = diffs{3};
      if i4 = 1 then temps{4} = -diffs{4}; else temps{4} = diffs{4};
      if i5 = 1 then temps{5} = -diffs{5}; else temps{5} = diffs{5};
      if i6 = 1 then temps{6} = -diffs{6}; else temps{6} = diffs{6};
```

```
      if i7 = 1 then temps{7} = -diffs{7}; else temps{7} = diffs{7};
      if i8 = 1 then temps{8} = -diffs{8}; else temps{8} = diffs{8};
      if i9 = 1 then temps{9} = -diffs{9}; else temps{9} = diffs{9};
      if i10 = 1 then temps{10} = -diffs{10}; else temps{10} = diffs
{10};
      if i11 = 1 then temps{11} = -diffs{11}; else temps{11} = diffs
{11};

      avg = sum(of temp01-temp11)/11;
      if sum(of i1-i11) > 0 then obs=0;
                              else obs=1;
      output;
    end;
    end;
    end;
    end;
    end;
    end;
    end;
    end;
    end;
    end;
    end;
    keep obs avg;
run;

proc sort data=perms2;
    by avg;
run;

data perms2;
    set perms2;
    if obs=1 then do;
      pval = 1 - _n_/2048;
      output;
    end;
run;

proc print data = perms2;
      var pval;
      format pval 5.2;
      title 'p-value: ';
%mend;


%pval;
```

3

Question	Gender	Occupation	Total	# Agree Yes	% Agree Yes	# Disagree No	% Disagree No
i2_23p1	.	.	2,936	1,970	67.1%	966	32.9%
i2_23p1	.	Professional	959	632	65.9%	327	34.1%
i2_23p1	.	Clerical/Sales	776	523	67.4%	253	32.6%
i2_23p1	.	Blue Collar	1,201	815	67.9%	386	32.1%
i2_23p1	Male	.	1,638	1,079	65.9%	559	34.1%
i2_23p1	Female	.	1,298	891	68.6%	407	31.4%
i2_23p1	Male	Professional	518	338	65.3%	180	34.7%
i2_23p1	Male	Clerical/Sales	310	214	69.0%	96	31.0%
i2_23p1	Male	Blue Collar	810	527	65.1%	283	34.9%
i2_23p1	Female	Professional	441	294	66.7%	147	33.3%
i2_23p1	Female	Clerical/Sales	466	309	66.3%	157	33.7%
i2_23p1	Female	Blue Collar	391	288	73.7%	103	26.3%
i2_24p1	.	.	2,812	947	33.7%	1,865	66.3%
i2_24p1	.	Professional	915	300	32.8%	615	67.2%
i2_24p1	.	Clerical/Sales	759	254	33.5%	505	66.5%
i2_24p1	.	Blue Collar	1,138	393	34.5%	745	65.5%
i2_24p1	Male	.	1,521	540	35.5%	981	64.5%
i2_24p1	Female	.	1,291	407	31.5%	884	68.5%
i2_24p1	Male	Professional	481	169	35.1%	312	64.9%
i2_24p1	Male	Clerical/Sales	294	115	39.1%	179	60.9%
i2_24p1	Male	Blue Collar	746	256	34.3%	490	65.7%
i2_24p1	Female	Professional	434	131	30.2%	303	69.8%
i2_24p1	Female	Clerical/Sales	465	139	29.9%	326	70.1%
i2_24p1	Female	Blue Collar	392	137	34.9%	255	65.1%
i2_26p1	.	.	2,878	1,877	65.2%	1,001	34.8%
i2_26p1	.	Professional	950	668	70.3%	282	29.7%
i2_26p1	.	Clerical/Sales	776	504	64.9%	272	35.1%
i2_26p1	.	Blue Collar	1,152	705	61.2%	447	38.8%

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GINA GLANTZ

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i2_26p1	Male	.	1,586	1,007	63.5%	579	36.5%
i2_26p1	Female	.	1,292	870	67.3%	422	32.7%
i2_26p1	Male	Professional	503	348	69.2%	155	30.8%
i2_26p1	Male	Clerical/Sales	313	197	62.9%	116	37.1%
i2_26p1	Male	Blue Collar	770	462	60.0%	308	40.0%
i2_26p1	Female	Professional	447	320	71.6%	127	28.4%
i2_26p1	Female	Clerical/Sales	463	307	66.3%	156	33.7%
i2_26p1	Female	Blue Collar	382	243	63.6%	139	36.4%
i2_29	.	.	3,034	2,390	78.8%	644	21.2%
i2_29	.	Professional	997	772	77.4%	[illegible]	22.6%
i2_29	.	Clerical/Sales	810	645	79.6%	165	20.4%
i2_29	.	Blue Collar	1,227	973	79.3%	254	20.7%
i2_29	Male	.	1,668	1,320	79.1%	[illegible]	20.9%
i2_29	Female	.	1,366	1,070	78.3%	296	21.7%
i2_29	Male	Professional	531	402	75.7%	129	24.3%
i2_29	Male	Clerical/Sales	319	263	82.4%	56	17.6%
i2_29	Male	Blue Collar	818	655	80.1%	[illegible]	19.9%
i2_29	Female	Professional	466	370	79.4%	[illegible]	20.6%
i2_29	Female	Clerical/Sales	491	382	77.8%	[illegible]	22.2%
i2_29	Female	Blue Collar	409	318	77.8%	91	22.2%
i2_30	.	.	3,052	1,689	55.3%	1,363	44.7%
i2_30	.	Professional	1,007	527	52.3%	480	47.7%
i2_30	.	Clerical/Sales	805	435	54.0%	370	46.0%
i2_30	.	Blue Collar	1,240	727	58.6%	513	41.4%
i2_30	Male	.	1,687	1,013	60.0%	674	40.0%
i2_30	Female	.	1,365	676	49.5%	689	50.5%
i2_30	Male	Professional	539	301	55.8%	238	44.2%
i2_30	Male	Clerical/Sales	317	191	60.3%	126	39.7%
i2_30	Male	Blue Collar	831	521	62.7%	310	37.3%
i2_30	Female	Professional	468	226	48.3%	242	51.7%
i2_30	Female	Clerical/Sales	488				

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		244	50.0%	244	50.0%
i2_30	Female Blue Collar	409			
		206	50.4%	203	49.6%

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4

```
libname eval1989 '/data05a/rjrfalise/COMMIT/001113/1989
_Evaluation_Cohort';

options nocenter nodate nonumber;

*********************************************************;
* PROC FORMAT - create formats for analysis variables ;
*********************************************************;

proc format library=work;
       value sex 1='Male'
                 2='Female';
       value occupation 1='Professional'
                        2='Clerical/Sales'
                        3='Blue Collar';
       value agree 1='Agree'
                   2='Disagree';
       value likely 1-2='Likely'
                    3-4='Unlikely';
       value yes 1='Yes'
                 2='No';
quit;

***********************************************************************
***********;
* AGREE macro - calculate metrics for variables formatted using the
agree format ;
***********************************************************************
***********;

%macro agree(invar);

proc sort data=eval1989.eval89 (where=((sex in (1,2)) and
                                       (i4_9b in (1,2,3)) and
                                       (i1_6=1) and
                                       (&invar in (1,2))))
           out=&invar;
       by sex i4_9b;
quit;

proc freq data=&invar;
       by sex i4_9b;
       tables &invar / missing
                       noprint
                       out=&invar (drop=percent);
       format sex sex.
              i4_9b occupation.
              &invar agree.;
quit;

proc transpose data=&invar
               out=&invar (drop=_LABEL_ _NAME_);
       by sex i4_9b;
       var count;
       id &invar;
quit;

proc summary data=&invar;
       class sex i4_9b;
       var agree disagree;
       output out=&invar (drop=_FREQ_ _TYPE_)
```


Wecker
EXHIBIT NO. 10
12-13-
GINA GLANTZ

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```
                sum=agree disagree;
quit;

data &invar;
       set &invar;

       label sex='Gender'
             i4_9b='Occupation';

       format agree comma5.0;
       label agree='#*Agree';

       format disagree comma5.0;
       label disagree='#*Disagree';

       length total 8.;
       format total comma5.0;
       label total='Total';
       total=sum(agree,disagree);

       length agree_pct 8.;
       format agree_pct percent7.1;
       label agree_pct='%*Agree';
       agree_pct=agree/total;

       length disagree_pct 8.;
       format disagree_pct percent7.1;
       label disagree_pct='%*Disagree';
       disagree_pct=disagree/total;

       length question $ 8;
       label question='Question';
       question="&invar";

run;

%mend  agree;

%agree(i2_23p1);
%agree(i2_24p1);
%agree(i2_26p1);

*********************************************************************
*************;
* LIKELY macro - calculate metrics for variables formatted using the
likely format ;
*********************************************************************
*************;

%macro likely(invar);

proc sort data=eval1989.eval89 (where=((sex in (1,2)) and
                                       (i4_9b in (1,2,3)) and
                                       (i1_6=1) and
                                       (&invar in (1,2,3,4))))
           out=&invar;
       by sex i4_9b;
quit;

proc freq data=&invar;
       by sex i4_9b;
```


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```
        tables &invar / missing
                       noprint
                       out=&invar (drop=percent);
        format sex sex.
               i4_9b occupation.
               &invar likely.;
quit;

proc transpose data=&invar
                    out=&invar (drop=_LABEL_ _NAME_);
        by sex i4_9b;
        var count;
        id &invar;
quit;

proc summary data=&invar;
        class sex i4_9b;
        var likely unlikely;
        output out=&invar (drop=_FREQ_ _TYPE_)
               sum=likely unlikely;
quit;

data &invar;
        set &invar;

        label sex='Gender'
              i4_9b='Occupation';

        format likely comma5.0;
        label likely='#*Likely';

        format unlikely comma5.0;
        label unlikely='#*Unlikely';

        length total 8.;
        format total comma5.0;
        label total='Total';
        total=sum(likely,unlikely);

        length likely_pct 8.;
        format likely_pct percent7.1;
        label likely_pct='%*Likely';
        likely_pct=likely/total;

        length unlikely_pct 8.;
        format unlikely_pct percent7.1;
        label unlikely_pct='%*Unlikely';
        unlikely_pct=unlikely/total;

        length question $ 8;
        label question='Question';
        question="&invar";
run;

%mend  likely;

%likely(i2_29);

*************************************************************************
*****;
```


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```
* YES macro - calculate metrics for variables formatted using the yes
format ;
***************************************************************************
*****;

%macro yes(invar);

proc sort data=eval1989.eval89 (where=((sex in (1,2)) and
                                       (i4_9b in (1,2,3)) and
                                       (i1_6=1) and
                                       (&invar in (1,2))))
          out=&invar;
     by sex i4_9b;
quit;

proc freq data=&invar;
     by sex i4_9b;
     tables &invar / missing
                     noprint
                     out=&invar (drop=percent);
     format sex sex.
            i4_9b occupation.
            &invar yes.;
quit;

proc transpose data=&invar
               out=&invar (drop=_LABEL_ _NAME_);
     by sex i4_9b;
     var count;
     id &invar;
quit;

proc summary data=&invar;
     class sex i4_9b;
     var yes no;
     output out=&invar (drop=_FREQ_ _TYPE_)
            sum=yes no;
quit;

data &invar;
     set &invar;

     label sex='Gender'
           i4_9b='Occupation';

     format yes comma5.0;
     label yes='#*Yes';

     format no comma5.0;
     label no='#*No';

     length total 8.;
     format total comma5.0;
     label total='Total';
     total=sum(yes,no);

     length yes_pct 8.;
     format yes_pct percent7.1;
     label yes_pct='%*Yes';
     yes_pct=yes/total;
```

```
        length no_pct 8.;
        format no_pct percent7.1;
        label no_pct="%*No";
        no_pct=no/total;

        length question $ 8;
        label question='Question';
        question="&invar";

run;

%mend  yes;

%yes(i2_30);

*************************************************************;
* DATFILE - combine datasets generated by macros and print ;
*************************************************************;

filename outfile '/home/rjrfalis/sac/11_29_00/89eval/89eval.tsv' lrecl=
3000;

data datfile;
        set i2_23p1
            i2_24p1
            i2_26p1
            i2_29
            i2_30;

        file outfile;
        put question '~'
            sex '~'
            i4_9b '~'
            total '~'
            agree '~'
            agree_pct '~'
            disagree '~'
            disagree_pct '~'
            likely '~'
            likely_pct '~'
            unlikely '~'
            unlikely_pct '~'
            yes '~'
            yes_pct '~'
            no '~'
            no_pct '~';

run;

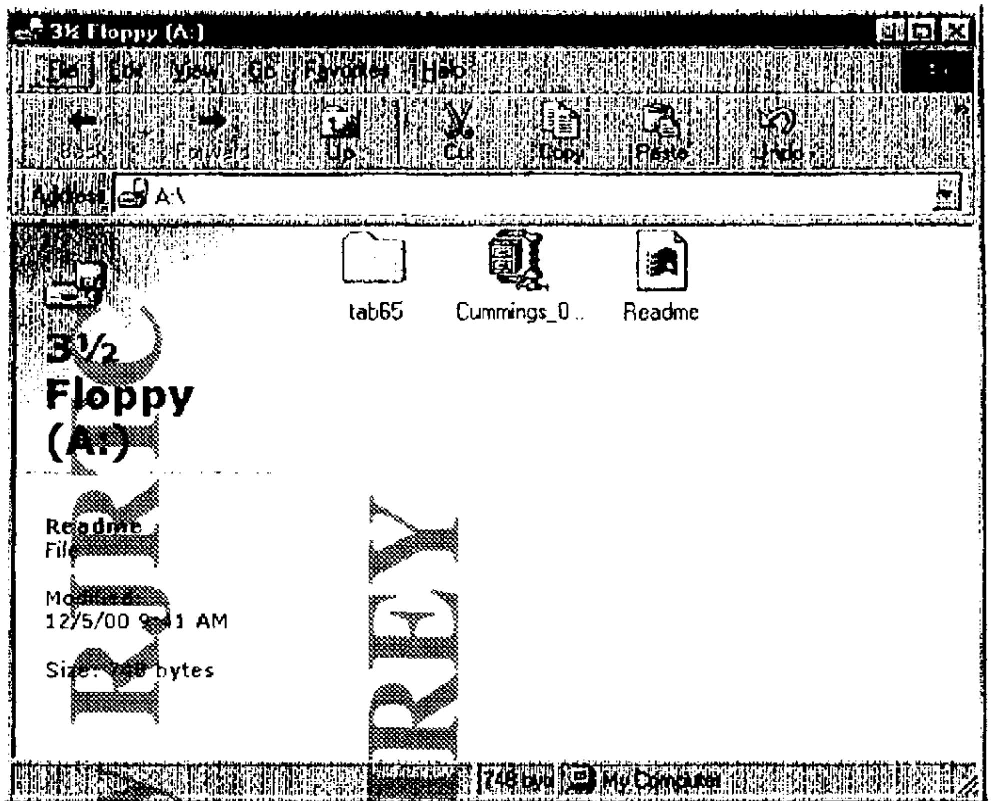
proc print data=datfile
              label
              noobs
              split='*'
              uniform;
        var question sex i4_9b total agree agree_pct disagree
disagree_pct
                                              likely likely_pct unlikely
unlikely_pct
                                              yes yes_pct no no_pct;
quit;
```

```
**********;
* ENDSAS ;
**********;

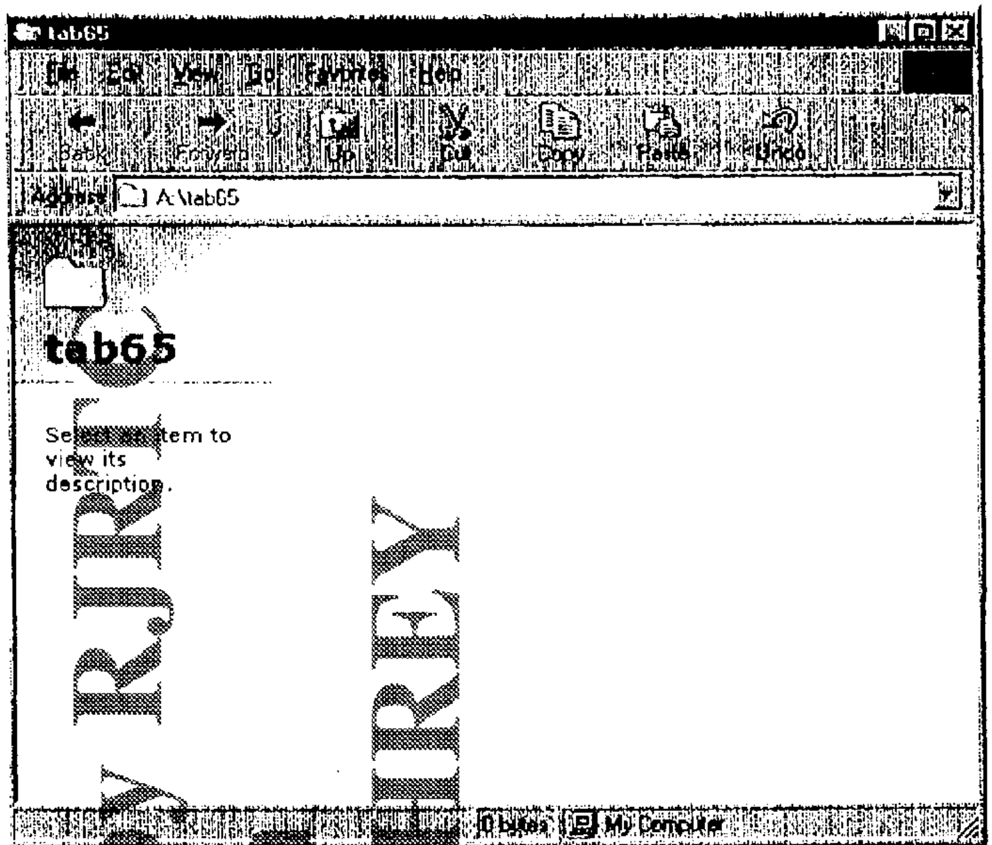
endsas;
```

produced by RJRTC
in
HUMPHREY

52614 0983



Wecker
EXHIBIT NO. 11
12-13-00
GINA GLANTZ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COMMIT endpoint cohort data 1993.sav ->
/data05a/rjrfalise/COMMIT/001103/endpoint_1993.sas7bdat

1988 Baseline survey_descriptive file2.dbf ->
/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort/base88_2.sas7bdat
1988 Baseline survey_detailed survey data.dbf ->
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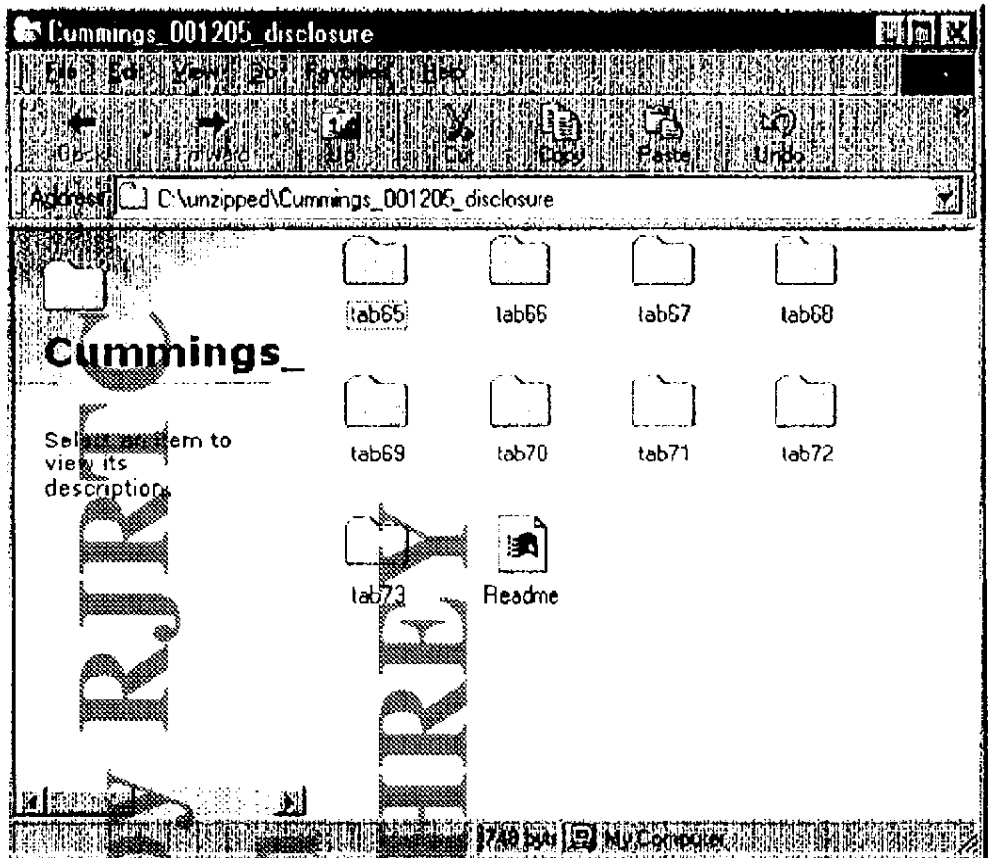
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Undo
Address C:\unzipped\Cummings_001205_disclosure
Cummings_
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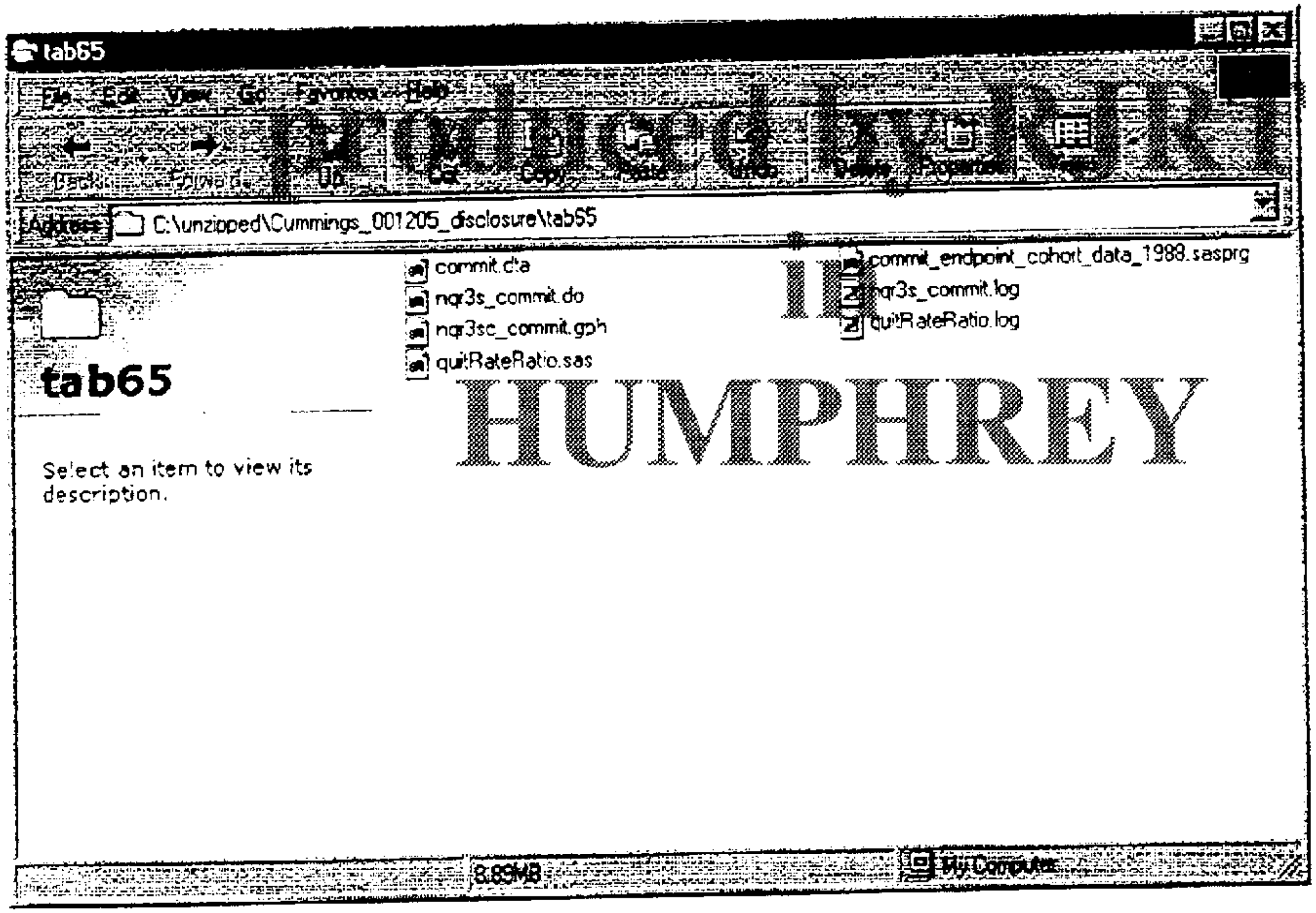
tab66
tab67
tab68
tab69
tab70
tab71
tab72
tab73
Readme
My Computer

52614 0987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nqr3s_commit.do
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quitRateRatio.sas
commit_endpoint_cohort_data_1988.sasprg
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quitRateRatio.log
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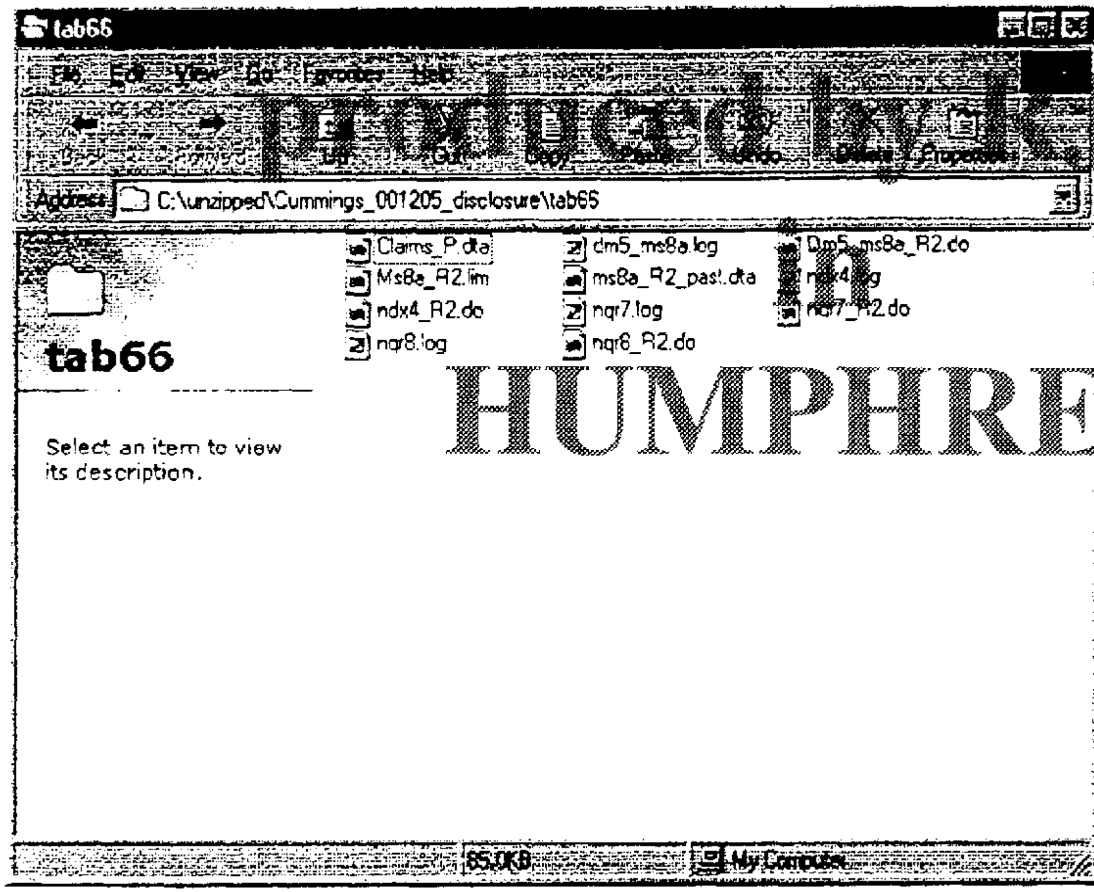
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Ms8a_R2.lim
ndx4_R2.do
nqr8.log
dm5_ms8a.log
ms8a_R2_past.dta
nqr7.log
nqr6_R2.do
Dm5_ms8a_R2.do
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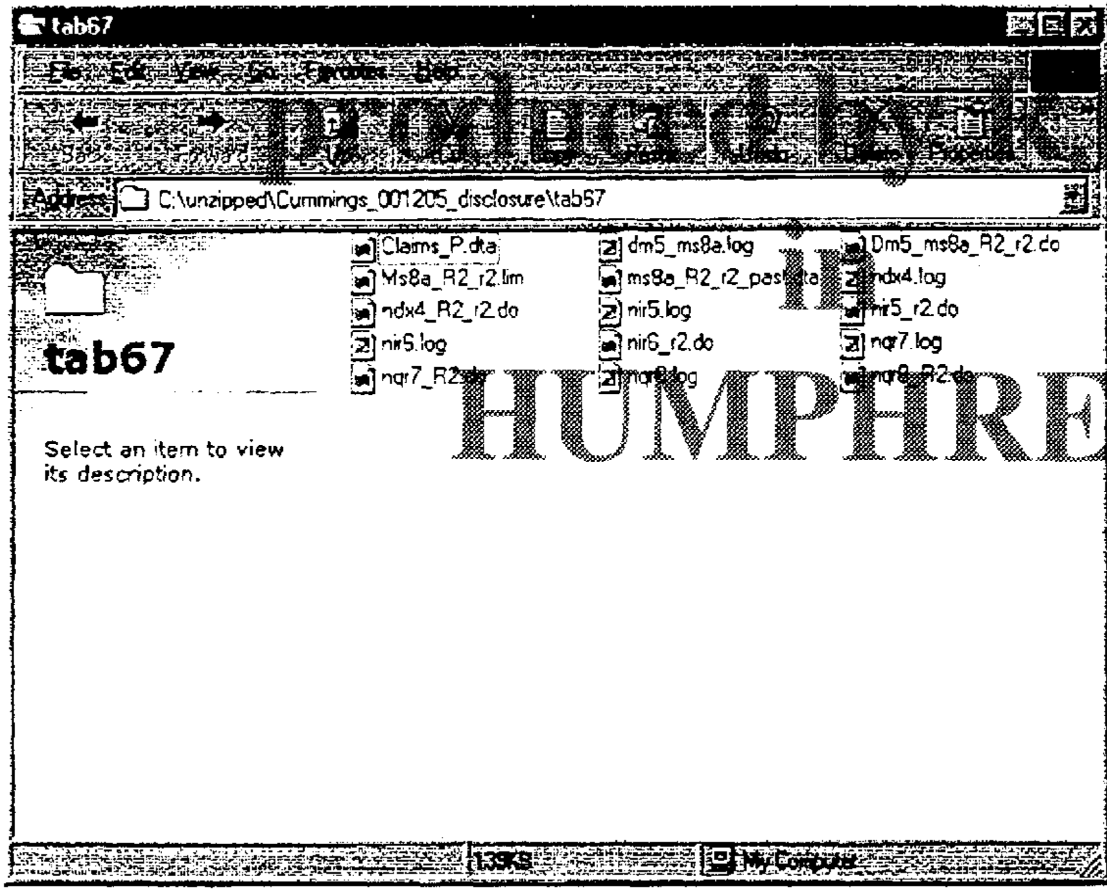
52614 0989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nir5.log
dm5_ms8a.log
nir5.log
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Dm5_ms8a_R2_r2.do
nqr7.log
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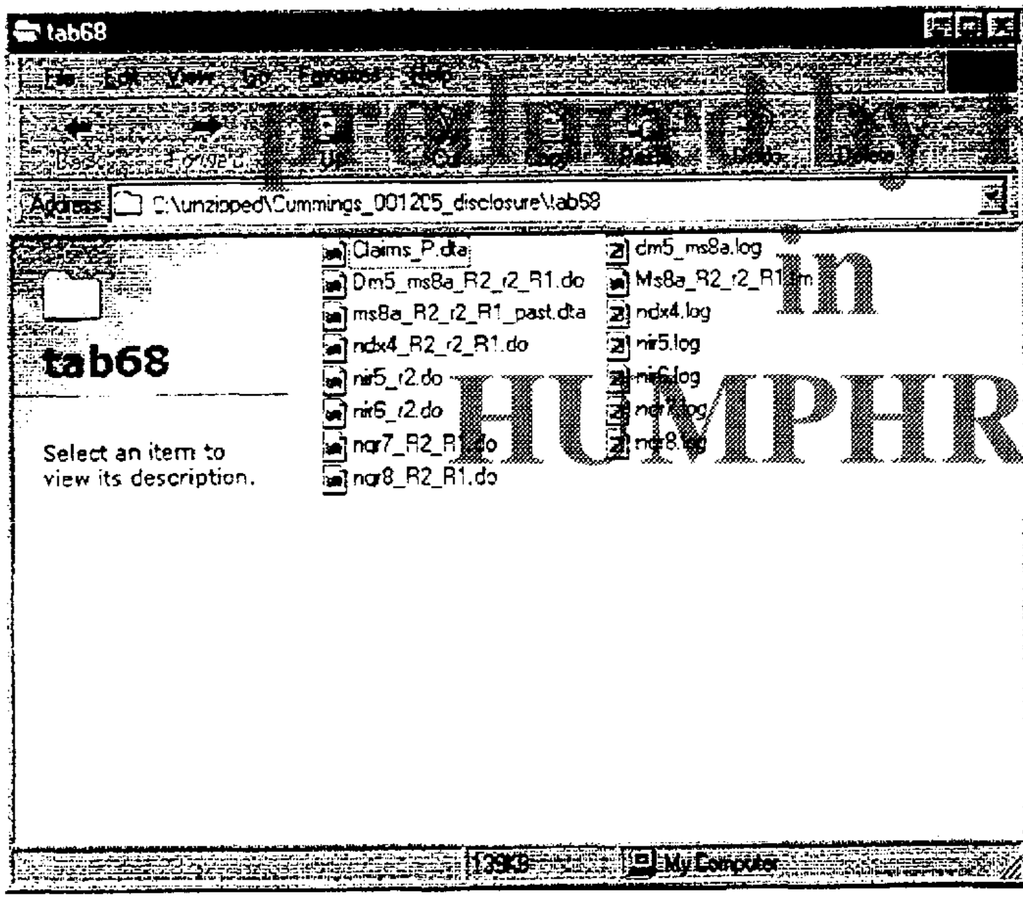
52614 0990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ms8a_R2_r2_R1_past.dta
ndx4_R2_r2_R1.do
nir5_r2.do
nir6_r2.do
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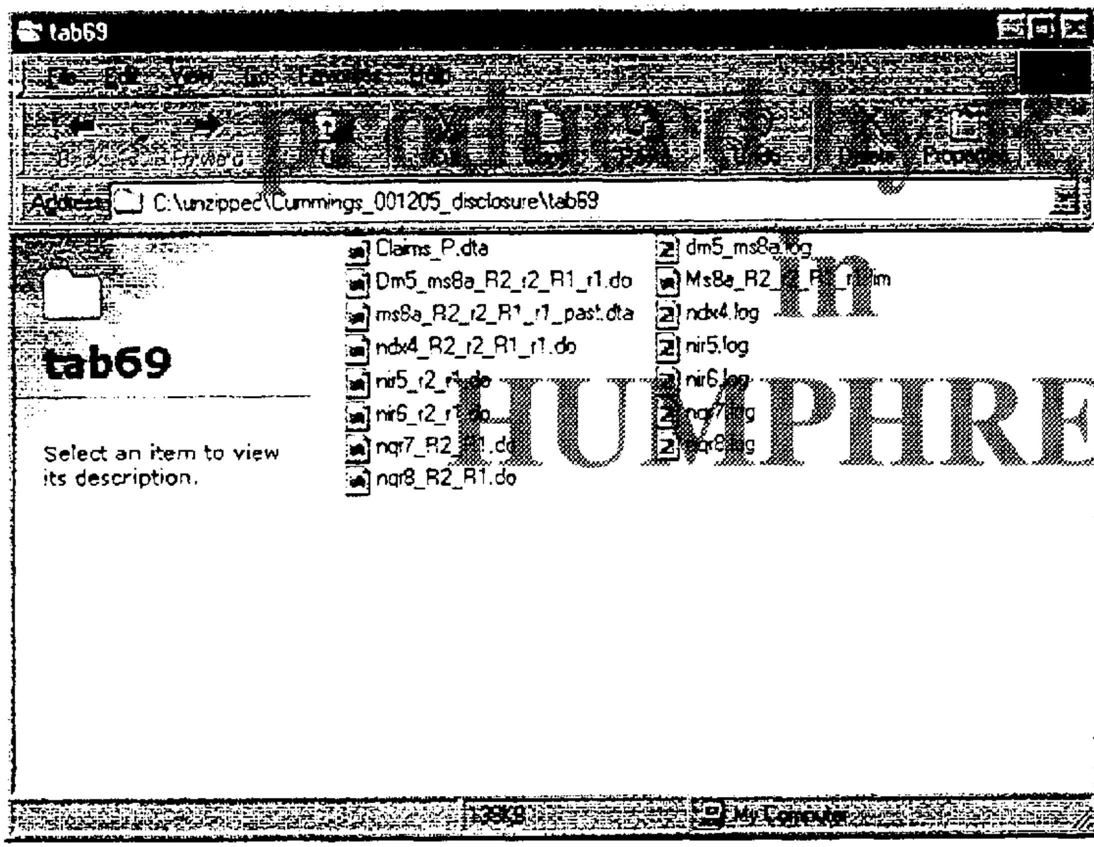
ndx4.log
nir5.log
My Computer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tab69
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ms8a_R2_r2_R1_r1_past.dta
ndx4_R2_r2_R1_r1.do
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nqr8_R2_R1.do
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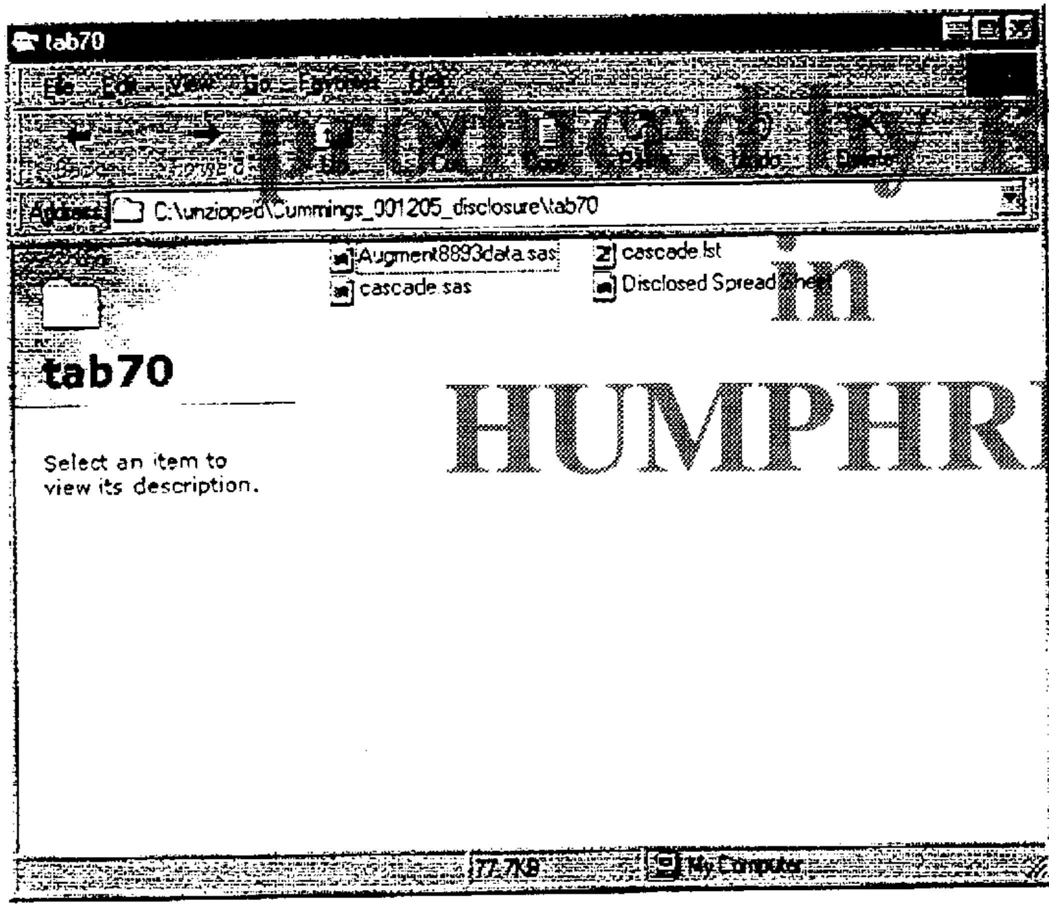
ndx4.log
nir5.log
My Computer

52614 0992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cascade.sas
cascade.lst
Disclosed Spread Sheet
tab70
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view its description.
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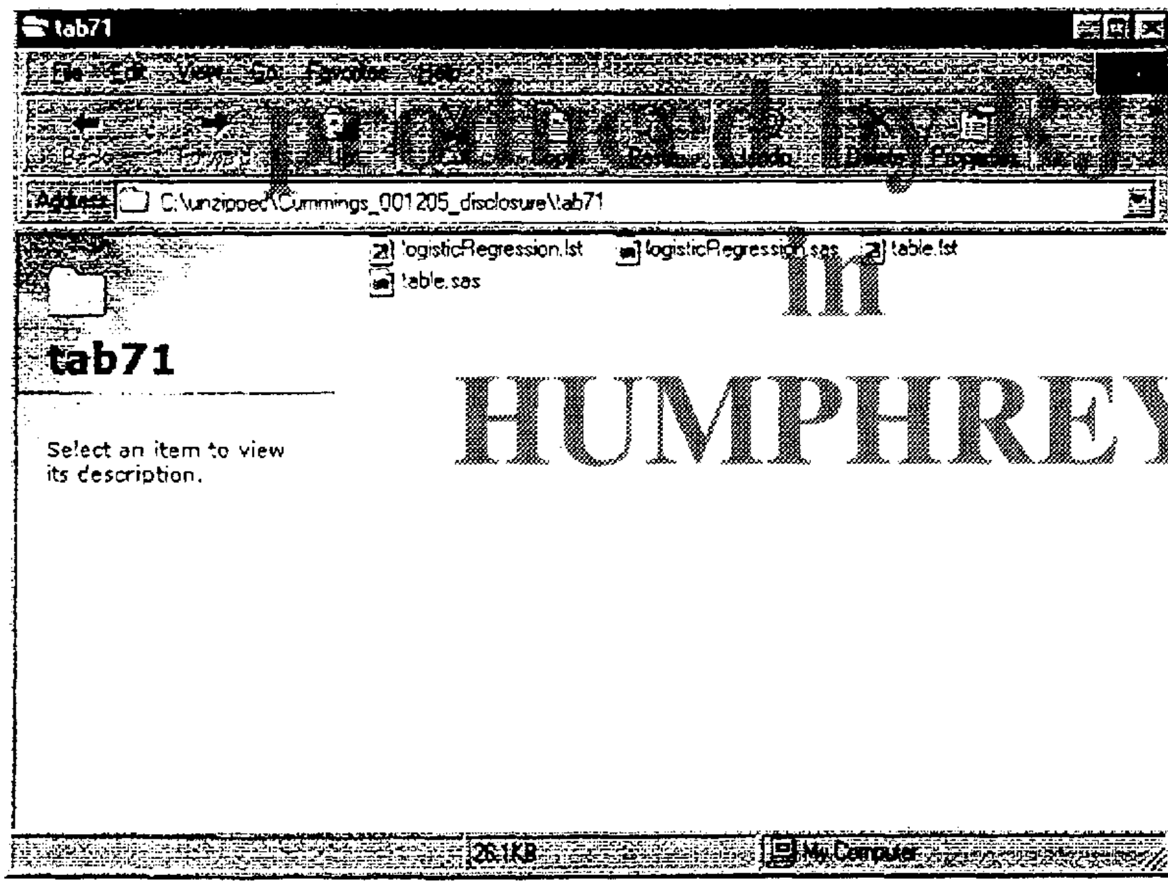
My Computer

52614 0993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logisticRegression.sas
table.lst
table.sas
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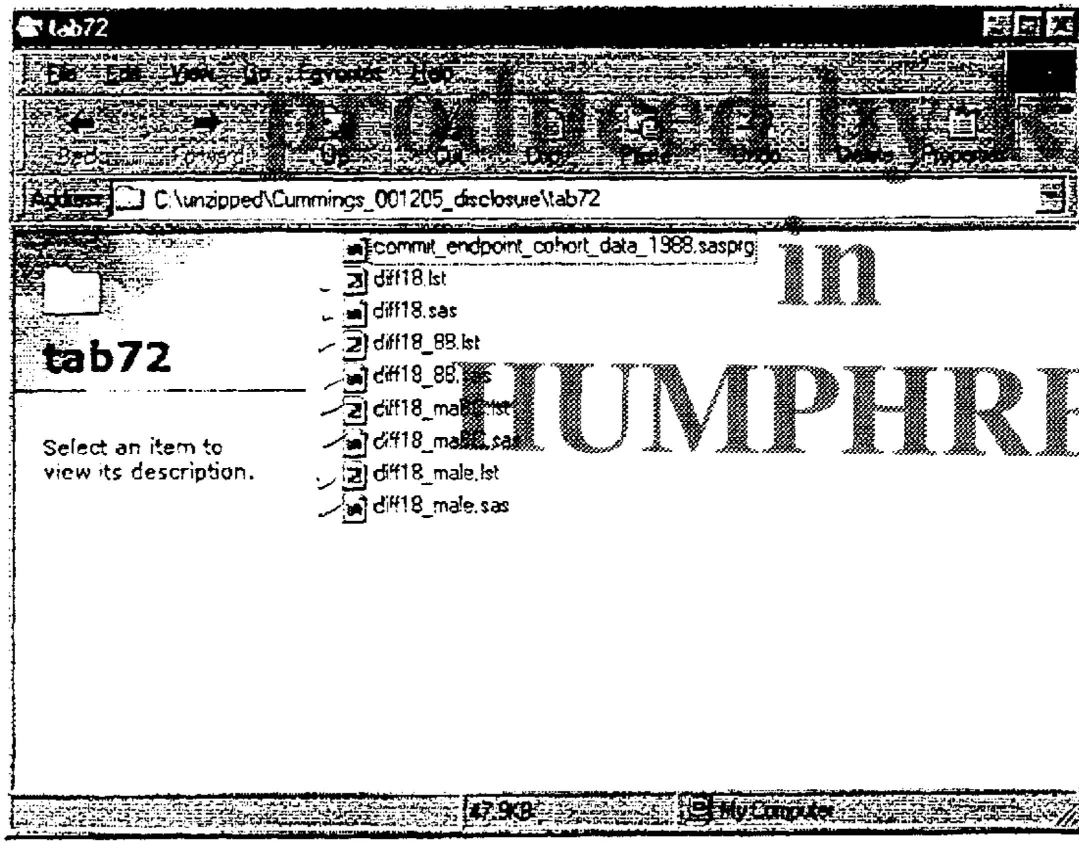
52614 0994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diff18.sas
diff18_88.lst
diff18_88.sas
diff18_male.lst
diff18_male.sas
diff18_male.lst
diff18_male.sas
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My Computer

52614 0995


tab73
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Claims_rR.xls
rR_probs.xls
tab73
Select an item to view its description.
My Computer

Relevant data files received from plaintiffs 001103 and 001113 have been translated into SAS7/8 format using DBMS/Copy Version 7.0.0. The SAS7/8 library and file names correspond to the original file names as follows:

COMMIT endpoint cohort data 1988.sav ->
/data05a/rjrfalise/COMMIT/001103/endpoint_1988.sas7bdat
COMMIT endpoint cohort data 1993.sav ->
/data05a/rjrfalise/COMMIT/001103/endpoint_1993.sas7bdat

1988 Baseline survey_descriptive file2.dbf ->
/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort/base88_2.sas7bdat
1988 Baseline survey_detailed survey data.dbf ->
/data05a/rjrfalise/COMMIT/001113/1988_Endpoint_Cohort/base88_d.sas7bdat

endpnt.sav ->
/data05a/rjrfalise/COMMIT/001113/1993_Endpoint_Cohort/endpnt.sas7bdat

52614 0997

Ealise: Predictors of Smoking Cessation Between 1988 and 1993 as reported by Hymowitz (1997; Tbl 2) Plus Occupational Group, Estimated Using Logistic Regression from COMMIT Data Produced by Cummings (11/10/00)

Characteristic	Sample Size	% Quit	As Reported by Hymowitz (1997; Table 2) Odds Ratio*	95% CI		P-value	Predictors Used by Hymowitz (1997;Table 2) & Occup. Group Odds Ratio	95% CI	
COMMIT Community**									
Comparison	6,733	23.4%	1.00	Referent			1.00	Referent	
Intervention	6,682	24.6%	1.07	0.98	1.17	0.1108	1.07	0.98	1.17
Sex									
Male	6,599	24.0%	1.0[illegible]	Referent			1.00	Referent	
Female	6,816	23.9%	0.85	0.[illegible]8	0.94	0.0009	0.86	0.78	0.95
Age (years)									
25-34	[illegible],249	22.8%	1.0[illegible]	Referent			1.00	Referent	
[illegible]	4,249	22.0%	0.99	0.88	1.11	0.8649	0.99	0.88	1.11
[illegible]	2,817	24.6%	1.2[illegible]	[illegible]06	1.37	0.0038	1.20	1.06	1.37
55-64	2,100	29.3%	1.5[illegible]	[illegible]7	1.81	<.0001	1.57	1.36	1.80
Race									
White	10,072	2[illegible]	1.0[illegible]	Referent			1.00	Referent	
Black	882	2[illegible]	0.98	0.82	1.17	0.8362	0.98	0.82	1.17
Hispanic	697	30.0%	1.0[illegible]	0.87	1.28	0.5918	1.05	0.87	1.28
Canadian	1,449	23.1%	0.9[illegible]	0.81	1.13	0.6142	0.95	0.81	1.12
Asian	138	28.3%	0.9[illegible]	[illegible]9	1.37	0.6274	0.91	0.60	1.39
American Indian	117	20.5%	0.89	0.55	1.45	0.6470	0.89	0.55	1.44
Other	42	33.3%	1.4[illegible]	0.73	3.02	0.2695	1.50	0.74	3.05
Annual household income									
< $1[illegible]	1,139	20.3%	1.0[illegible]	Referent			1.00	Referent	
$10,000 - $2[illegible]	3,750	22.2%	1.1[illegible]	0.[illegible]7	1.38	0.1168	1.14	0.95	1.36
$25,001 [illegible]	4,087	24.2%	1.34	1.12	1.61	0.0014	1.32	1.10	1.58
> $4[illegible]	3,456	26.0%	1.4[illegible]	[illegible]2	1.77	<.0001	1.44	1.19	1.73
Education (years)									
<12	2,528	22.4%	1.00	Referent			1.00	Referent	
12	3,237	23.9%	1.03	0.89	1.19	0.6681	1.02	0.88	1.18
13-15	5,367	23.5%	1.00	0.87	1.15	0.9944	0.98	0.85	1.13
[illegible]	2,[illegible]57	26.9%	1.05	0.89	1.23	0.6012	1.00	0.84	1.19
Frequency of alcohol consumption									
Daily	1,572	20.9%	1.00	Referent			1.00	Referent	
3-4 times/week	1,286	21.0%	0.98	0.80	1.19	0.8273	0.98	0.80	1.19
1-2 times/week	3,064	23.4%	1.09	0.93	1.29	0.2829	1.09	0.93	1.29
1-3 times/month	2,299	24.8%	1.24	1.05	1.47	0.0137	1.24	1.05	1.48
1/month or never	5,100	25.6%	1.35	1.16	1.57	0.0001	1.35	1.16	1.58

Disclosed Spread Sheet
Sheet1

52614 0998

Wecker
EXHIBIT NO. 12
12-13-00
GINA GLANTZ

Cigarettes smoked daily in 1988									
>=25	5,566	18.7%	1.00	Referent			1.00	Referent	
15-24	4,783	22.7%	1.15	1.03	1.29	0.0103	1.15	1.03	1.29
5-14	2,356	32.4%	1.59	1.38	1.83	<.0001	1.59	1.38	1.83
<5	698	46.0%	2.38	1.92	2.96	<.0001	2.39	1.93	2.96
Age started smoking (years)									
<=15	3,225	21.2%	1.00	Referent			1.00	Referent	
16-19	6,606	23.1%	1.03	0.92	1.16	0.5908	1.03	0.92	1.16
>=20	3,584	28.1%	1.16	1.01	1.32	0.0310	1.16	1.01	1.32
Time to first cigarette (minutes)									
<10	4,329	17.9%	1.00	Referent			1.00	Referent	
10-30	3,960	21.1%	1.18	1.05	1.33	0.0069	1.18	1.05	1.33
31-60	2,431	26.2%	1.41	1.23	1.62	<.0001	1.41	1.23	1.62
>60	2,646	35.9%	1.84	1.59	2.14	<.0001	1.84	1.59	2.14
Use non-cigarette product									
No	13,003	24.0%	1.00	Referent			1.00	Referent	
Yes	408	24.3%	0.86	0.66	1.12	0.2554	0.86	0.66	1.13
Type of cigarette									
Premium	12,078	24.4%	1.00	Referent			1.00	Referent	
Discount	608	18.8%	0.85	0.68	1.07	0.1587	0.86	0.68	1.07
Generic	173	15.0%	0.64	0.41	0.99	0.0427	0.64	0.41	0.99
Quit attempts during 12 months prior to baseline									
0	8,235	22.6%	1.00	Referent			1.00	Referent	
1	2,427	24.4%	1.07	0.95	1.21	0.2468	1.07	0.95	1.21
>=2	2,717	27.7%	1.14	1.01	1.29	0.0324	1.14	1.01	1.29
Desire to quit									
Not at all	2,200	22.2%	1.00	Referent			1.00	Referent	
A little	2,116	22.9%	1.20	1.02	1.40	0.0296	1.20	1.02	1.40
Somewhat	4,126	22.9%	1.13	0.98	1.31	0.0890	1.13	0.98	1.31
A lot	4,882	26.0%	1.24	1.07	1.44	0.0037	1.24	1.07	1.44
Number of other household smokers									
0	7,206	25.5%	1.00	Referent			1.00	Referent	
>=1	6,209	22.1%	0.87	0.80	0.95	0.0026	0.87	0.80	0.96
Occupation Group									
Blue Collar	4,586	22.7%	-	-			1.00	Referent	
Professional	3,753	26.2%	-	-	-		1.08	0.95	1.23
Clerical / Sales	3,182	24.2%	-	-	-		1.03	0.91	1.17
None / Unknown	423	22.3%	-	-	-		0.94	0.81	1.10

*Labelled as a relative risk by Hymowitz et al

** Not originally presented in the paper

Disclosed Spread Sheet
Sheet1

52614 0999

InterventionCity Crossed with Time Crossed with State
Intervention is Interaction of InterventionCity and Time

The LOGISTIC Procedure

Model Information

Data Set	WORK.BEFOREAFTER
Response Variable (Events)	Events
Response Variable (Trials)	Trials
Number of Observations	44
Link Function	Logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Binary Outcome	Total Frequency
1	Event	40206
2	Nonevent	105209

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	171477.98	170874.60
SC	171487.87	171013.02
-2 Log L	171475.98	170846.60

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	629.3840	13	<.0001
Score	621.4195	13	<.0001
Wald	617.0955	13	<.0001

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EXHIBIT NO. 13
12-13-00
GINA GLANTZ

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-0.8611	0.0201	1842.3951	<.0001
ca	1	-0.1190	0.0273	19.0379	<.0001
on	1	-0.2962	0.0277	114.3997	<.0001

ia	1	-0.0667	0.0270	6.1201	0.0134
ma	1	-0.1472	0.0273	29.0393	<.0001
nj	1	-0.4348	0.0285	232.3970	<.0001
nm	1	0.1282	0.0265	23.3621	<.0001
ny1	1	-0.0791	0.0271	8.5326	0.0035
ny2	1	-0.1683	0.0273	37.9695	<.0001
nc	1	-0.1104	0.0272	16.5336	<.0001
or	1	-0.0193	0.0269	0.5124	0.4741
time	1	-0.1495	0.0297	25.3590	<.0001
InterventionCity	1	0.0499	0.0123	16.4778	<.0001
intervention	1	0.0436	0.0416	1.0987	0.2946

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ca	0.888	0.842	0.937
on	0.744	0.704	0.785
ia	0.935	0.887	0.986
ma	0.863	0.818	0.911
nj	0.647	0.612	0.685
nm	1.137	1.079	1.197
ny1	0.924	0.876	0.974
ny2	0.845	0.801	0.892
nc	0.895	0.849	0.944
or	0.981	0.931	1.034
time	0.861	0.812	0.913
InterventionCity	1.051	1.026	1.077
intervention	1.045	0.963	1.133

Association of Predicted Probabilities and Observed Responses

Percent Concordant	51.6	Somers' D	0.084
Percent Discordant	43.2	Gamma	0.089
Percent Tied	5.2	Tau-a	0.034
Pairs	4230033054	c	0.542

InterventionCity is the interaction affect since the analysis is conducted separately for each time period
InterventionCity is Crossed with State
Shows before the intervention study

The LOGISTIC Procedure

Model Information

Data Set	WORK.BEFOREAFTER
Response Variable (Events)	Events
Response Variable (Trials)	Trials
Number of Observations	22
Link Function	Logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Binary Outcome	Total Frequency
1	Event	36792
2	Nonevent	95208

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	156223.28	155586.94
SC	156233.[illegible]	155704.42
-2 Log L	156221.28	155562.94

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	658.3382	11	<.0001
Score	648.5437	11	<.0001
Wald	643.0361	11	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-0.8369	0.0207	1629.0151	<.0001

52614 1002

ca	1	-0.1451	0.0284	26.0813	<.0001
on	1	-0.3272	0.0291	126.6961	<.0001
ia	1	-0.0763	0.0282	7.3216	0.0068
ma	1	-0.1904	0.0286	44.4604	<.0001
nj	1	-0.5009	0.0298	281.8245	<.0001
nm	1	0.1172	0.0277	17.9264	<.0001
ny1	1	-0.1203	0.0283	18.0262	<.0001
ny2	1	-0.2006	0.0286	49.2328	<.0001
nc	1	-0.1277	0.0284	20.2831	<.0001
or	1	-0.0189	0.0280	0.4526	0.5011
InterventionCity	1	0.0500	0.0123	16.4916	<.0001

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ca	0.865	0.818	0.914
on	0.721	0.681	0.763
ia	0.927	0.877	0.979
ma	0.827	0.782	0.874
nj	0.606	0.572	0.642
nm	1.124	1.065	1.187
ny1	0.887	0.839	0.937
ny2	0.818	0.774	0.865
nc	0.880	0.833	0.930
or	0.981	0.929	1.037
InterventionCity	1.051	1.026	1.077

Association of Predicted Probabilities and Observed Responses

Percent Concordant	51.2	Somers' D	0.087
Percent Discordant	42.6	Gamma	0.093
Percent Tied	6.2	Tau-a	0.035
Pairs	3502892736	c	0.543

(InterventionCity Crossed with Time) Nested Within State

The LOGISTIC Procedure

Model Information

Data Set	WORK.BEFOREAFTER
Response Variable (Events)	Events
Response Variable (Trials)	Trials
Number of Observations	44
Link Function	Logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Binary Outcome	Total Frequency
1	Event	40206
2	Nonevent	105209

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	171477.98	170851.95
SC	171487.87	171079.36
-2 Log L	171475.98	170805.95

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	670.0338	22	<.0001
Score	662.2528	22	<.0001
Wald	657.1045	22	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-0.8360	0.0191	1921.0310	<.0001
ca	1	-0.1221	0.0336	13.1810	0.0003
on	1	-0.2251	0.0340	43.9617	<.0001
ia	1	-0.1165	0.0334	12.1519	0.0005

ma	1	-0.1790	0.0338	27.9818	<.0001
nj	1	-0.3940	0.0353	124.7281	<.0001
nm	1	0.0592	0.0327	3.2808	0.0701
ny1	1	-0.0714	0.0333	4.6111	0.0318
ny2	1	-0.1880	0.0339	30.8185	<.0001
nc	1	-0.1904	0.0339	31.5794	<.0001
or	1	-0.0388	0.0331	1.3697	0.2419
time	1	-0.1589	0.0296	28.8332	<.0001
ca*InterventionCity	1	0.00638	0.0393	0.0264	0.8710
on*InterventionCity	1	-0.1436	0.0406	12.5396	0.0004
ia*InterventionCity	1	0.0983	0.0385	6.5063	0.0107
ma*InterventionCity	1	0.0632	0.0394	2.5691	0.1090
nj*InterventionCity	1	-0.0830	0.0427	3.7808	0.0518
nm*InterventionCity	1	0.1365	0.0373	13.4162	0.0002
ny1*InterventionCity	1	-0.0155	0.0388	0.1605	0.6887
ny2*InterventionCity	1	0.0391	0.0395	0.9810	0.3220
nc*InterventionCity	1	0.1569	0.0390	16.1409	<.0001
or*InterventionCity	1	0.0388	0.0383	1.0287	0.3105
intervention	1	0.0621	0.0414	2.2469	0.1339

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
time	0.853	0.805	0.904
intervention	1.[illegible]	0.981	1.154

Association of Predicted Probabilities and Observed Responses

Percent Concordant	51.0	Somers' D	0.085
Percent Discordant	42.5	Gamma	0.091
Percent Tied	6.5	Tau-a	0.034
Pairs	4230033054	c	0.542

InterventionCity is the interaction affect since the analysis is conducted separately for each time period
InterventionCity is Nested in State
Shows before the intervention study

The LOGISTIC Procedure

Model Information

Data Set	WORK.BEFOREAFTER
Response Variable (Events)	Events
Response Variable (Trials)	Trials
Number of Observations	22
Link Function	Logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Binary Outcome	Total Frequency
1	Event	36792
2	Nonevent	95208

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	156223.28	155567.52
SC	156233.07	155773.12
-2 Log L	156221.28	155525.52

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	695.7591	20	<.0001
Score	686.0739	20	<.0001
Wald	679.6098	20	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-0.8118	0.0198	1684.1342	<.0001

ca	1	-0.1576	0.0350	20.2305	<.0001
on	1	-0.2550	0.0356	51.3593	<.0001
ia	1	-0.1227	0.0348	12.4031	0.0004
ma	1	-0.2289	0.0354	41.7517	<.0001
nj	1	-0.4595	0.0370	154.6160	<.0001
nm	1	0.0442	0.0341	1.6861	0.1941
ny1	1	-0.1080	0.0348	9.6393	0.0019
ny2	1	-0.2083	0.0353	34.7974	<.0001
nc	1	-0.2032	0.0353	33.1600	<.0001
or	1	-0.0450	0.0345	1.7052	0.1916
caInterventionCity	1	0.0249	0.0408	0.3741	0.5408
onInterventionCity	1	-0.1470	0.0426	11.8858	0.0006
iaInterventionCity	1	0.0920	0.0402	5.2426	0.0220
maInterventionCity	1	0.0764	0.0412	3.4360	0.0638
njInterventionCity	1	-0.0836	0.0447	3.4977	0.0615
nmInterventionCity	1	0.1442	0.0388	13.8352	0.0002
ny1InterventionCity	1	-0.0247	0.0406	0.3700	0.5430
ny2InterventionCity	1	0.0153	0.0413	0.1381	0.7102
ncInterventionCity	1	0.1486	0.0407	13.3541	0.0003
orInterventionCity	1	0.0520	0.0397	1.7173	0.1900

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ca	0.854	0.798	0.915
on	0.775	0.723	0.831
ia	0.885	0.826	0.947
ma	0.795	0.742	0.853
nj	0.632	0.587	0.679
nm	1.045	0.978	1.117
ny1	0.898	0.839	0.961
ny2	0.812	0.758	0.870
nc	0.816	0.762	0.875
or	0.956	0.894	1.023
caInterventionCity	1.025	0.947	1.111
onInterventionCity	0.863	0.794	0.939
iaInterventionCity	1.096	1.013	1.186
maInterventionCity	1.079	0.996	1.170
njInterventionCity	0.920	0.843	1.004
nmInterventionCity	1.155	1.071	1.246
ny1InterventionCity	0.976	0.901	1.056
ny2InterventionCity	1.015	0.937	1.101
ncInterventionCity	1.160	1.071	1.256
orInterventionCity	1.053	0.975	1.139

Association of Predicted Probabilities and Observed Responses

Percent Concordant	51.7	Somers' D	0.088
Percent Discordant	42.9	Gamma	0.093
Percent Tied	5.4	Tau-a	0.035
Pairs	3502892736	c	0.544

The afterCount used in the Logistic Regression

community	
Hayward	537
Vallejo	550
Peterborough	695
Brantford	754
Cedar Rapids	684
Davenport	661
Lowell	601
Fitchburg/Leominster	558
Patterson	450
Trenton	526
Las Cruces	628
Sante Fe	612
Yonkers	569
New Rochelle	620
Utica	673
Binghampton/Johnson City	620
Greensboro	612
Raleigh	638
Medford/Ashland	597
Albany/Corvallis	615
Bellingham	597
Longview/Kelso	618

The replication of the Cummings 1.8%

commit		percent
control	10194	0.246703
treatment	10153	0.264726

The Percentages That Go Into the Logistic Regression

COMCODE	commit	weighted Percent
1.00	control	0.272804
2.00	treatment	0.242963
3.00	control	0.237084
4.00	treatment	0.226749
5.00	treatment	0.257236
6.00	control	0.214855
7.00	control	0.285627
8.00	treatment	0.285905
9.00	treatment	0.289748
10.00	control	0.281444
11.00	control	0.262309

12.00	treatment	0.286452
13.00	treatment	0.31139
14.00	control	0.279933
15.00	treatment	0.288603
16.00	control	0.228078
17.00	control	0.212261
18.00	treatment	0.269125
19.00	treatment	0.216584
20.00	control	0.225494
21.00	treatment	0.23723
22.00	control	0.21384

year	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
	BL	CF	BL	CF	BL	CF	BL	CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	232	18	78	50	143	41	95
1997	852	429	601	587	1165	1252	1024	1278
1998	1408	709	2386	2054	3823	3854	3811	4540
1999	2265	1140	16423	13102	24116	23044	8291	12334
2000	2960	1490	15359	12370	24575	23477	10674	14726
TOTAL	7945	4000	34787	28191	53729	51770	23841	32973
1992	14	7	1	3	0	3	0	2
1993	17	9	2	4	0	4	0	2
1994	555	279	6	82	3	122	0	59
1995	933	470	44	165	30	230	21	126
1996	1612	811	1003	1006	3356	3349	3722	4293
1997	2405	1210	4262	3654	7262	7236	5453	6783
1998	2111	1062	3967	3383	6992	6909	5907	7153
1999	2653	1335	22284	17719	35603	33666	12023	17725
2000	3685	1855	20135	16190	30318	29095	13653	18773
TOTAL	13985	7038	51704	42206	83564	80614	40779	54916
CF - BL		6947		9498		2950		

year	Lung Cancer BL	Lung Cancer CF	Disabling BID BL	Disabling BID CF	Non-Disabling BID BL	Non-Disabling BID CF	Pleural Injury BL	Pleural Injury CF
2000	1856	846	6315	5019	10105	9713	5848	7820
2001	1836	837	6248	4965	9997	9609	5782	7733
2002	1807	824	6155	4891	9848	9465	5692	7614
2003	1773	809	6042	4801	9667	9291	5583	7470
2004	1735	791	5913	4699	9461	9093	5460	7306
2005	1692	771	5774	4588	9238	8878	5327	7129
2006	1580	721	5300	4215	8477	8153	4517	6174
2007	1487	678	4920	3916	7865	7570	3911	5451
2008	1435	654	4751	3781	7594	7309	3752	5239
2009	1381	630	4573	3639	7309	7035	3587	5018
2010	1324	604	4386	3491	7011	6748	3414	4787
2011	1265	577	4193	3337	6700	6449	3237	4549
2012	1205	549	3993	3178	6382	6142	3056	4306
2013	1142	521	3790	3016	6056	5828	2873	4059
2014	1080	492	3584	2852	5726	5511	2690	3811
2015	1016	463	3377	2687	5395	5192	2508	3564
2016	954	435	3171	2524	5066	4875	2328	3320
2017	893	407	2968	2362	4741	4563	2154	3083
2018	832	379	2769	2203	4422	4256	1985	2851
2019	773	352	2576	2049	4113	3958	1823	2628
2020	716	326	2388	1900	3813	3669	1668	2415
2021	662	302	2208	1756	3524	3391	1522	2212
2022	609	277	2035	1619	3247	3125	1383	2019
2023	559	255	1869	1487	2982	2870	1252	1836
2024	510	233	[illegible]	1360	2729	2625	1129	1663
2025	465	212	[illegible]	1240	2486	2392	1013	1500
2026	421	192	1415	1125	2256	2170	905	1346
2027	379	173	[illegible]	1016	2038	1960	803	1202
2028	341	156	1150	915	1834	1764	711	1070
2029	305	[illegible]	[illegible]	820	1644	1581	627	948
2030	272	124	922	733	1469	1413	550	837
2031	242	110	820	652	1306	1257	481	736
2032	214	[illegible]	726	577	1157	1113	417	644
2033	188	86	640	508	1018	979	361	560
2034	163	74	[illegible]	443	889	854	308	482
2035	141	64	482	383	767	737	260	410
2036	119	54	411	326	653	628	217	344
2037	99	45	345	273	548	526	178	285
2038	82	37	285	226	452	435	143	231
2039	67	30	231	183	367	353	113	184
2040	52	24	184	146	293	281	88	145
2041	41	19	[illegible]	115	230	221	67	111
2042	31	14	112	89	178	171	50	84
2043	24	11	85	68	135	130	37	63
2044	17	8	65	51	102	98	27	47
2045	13	6	[illegible]	38	76	73	20	34
2046	9	4	36	28	56	54	14	25
2047	7	3	26	21	41	39	10	18
2048	5	2	19	15	30	29	7	12
2049	3	1	14	11	22	21	5	9
TOTAL	33818	15421	113593	90336	181512	174599	89889	125385

52614 1011

year	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
	BL	CF	BL	CF	BL	CF	BL	CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	232	18	78	50	143	41	95
1997	852	429	601	587	1165	1252	1024	1278
1998	1408	709	2386	2054	3823	3854	3811	4540
1999	2265	1140	16423	13102	24116	23044	8291	12334
2000	2960	1490	15359	12370	24575	23477	10674	14726
TOTAL	7945	4000	34787	28191	53729	51770	23841	32973
1992	14	7	1	3	0	3	0	2
1993	17	9	2	4	0	4	0	2
1994	555	279	6	82	3	122	0	59
1995	933	470	44	165	30	230	21	126
1996	1612	811	[illegible]	1006	3356	3349	3722	4293
1997	2405	1210	4262	3654	7262	7236	5453	6783
1998	2111	1062	3967	3383	6992	6909	5907	7153
1999	2653	1335	22264	17719	35603	33666	12023	17725
2000	3685	1855	[illegible]	16190	30318	29095	13653	18773
TOTAL	13985	7038	[illegible]	42206	83564	80614	40779	54916
CF - BL		6947		9498		2950		

52614 1012

year	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
	BL	CF	BL	CF	BL	CF	BL	CF
2000	1856	846	6315	5019	10105	9713	5848	7820
2001	1836	837	6248	4965	9997	9609	5782	7733
2002	1807	824	6155	4891	9848	9465	5692	7614
2003	1773	809	6042	4801	9667	9291	5583	7470
2004	1735	791	5913	4699	9461	9093	5460	7306
2005	1692	771	5774	4588	9238	8878	5327	7129
2006	1580	721	5300	4215	8477	8153	4517	6174
2007	1487	678	4920	3916	7865	7570	3911	5451
2008	1435	654	4751	3781	7594	7309	3752	5239
2009	1381	630	4573	3639	7309	7035	3587	5018
2010	1324	604	4386	3491	7011	6748	3414	4787
2011	1265	577	4193	3337	6700	6449	3237	4549
2012	1205	549	3993	3178	6382	6142	3056	4306
2013	1142	521	3790	3016	6056	5828	2873	4059
2014	1080	492	3584	2852	5726	5511	2690	3811
2015	1016	463	3377	2687	5395	5192	2508	3564
2016	954	435	3171	2524	5066	4875	2328	3320
2017	893	407	2968	2362	4741	4563	2154	3083
2018	832	379	[illegible]	2203	4422	4256	1985	2851
2019	773	352	2576	2049	4113	3958	1823	2628
2020	716	326	2388	1900	3813	3669	1668	2415
2021	662	302	2208	1756	3524	3391	1522	2212
2022	609	277	[illegible]	1619	3247	3125	1383	2019
2023	559	255	1869	1487	2982	2870	1252	1836
2024	510	233	1710	1360	2729	2625	1129	1663
2025	465	212	1559	1240	2486	2392	1013	1500
2026	421	192	1415	1125	2256	2170	905	1346
2027	379	173	1278	1016	2038	1960	803	1202
2028	341	156	1150	915	1834	1764	711	1070
2029	305	139	1032	820	1644	1581	627	948
2030	272	124	922	733	1469	1413	550	837
2031	242	110	820	652	1306	1257	481	736
2032	214	97	726	577	1157	1113	417	644
2033	188	86	640	508	1018	979	361	560
2034	163	74	558	443	889	854	308	482
2035	141	64	482	383	767	737	260	410
2036	119	54	411	326	653	628	217	344
2037	99	45	343	273	548	526	178	285
2038	82	37	285	226	452	435	143	231
2039	67	30	231	183	367	353	113	184
2040	52	24	184	146	293	281	88	145
2041	41	19	145	115	230	221	67	111
2042	31	14	112	89	178	171	50	84
2043	24	11	88	68	135	130	37	63
2044	17	8	65	51	102	98	27	47
2045	13	6	48	38	76	73	20	34
2046	9	4	36	28	56	54	14	25
2047	7	3	26	21	41	39	10	18
2048	5	2	19	15	30	29	7	12
2049	3	1	14	11	22	21	5	9
TOTAL	33818	15421	113593	90336	181512	174599	89889	125385

52614 1013

Harris Report 7 Replication
with R2 changed 3.0 to 1.0

year	Lung Cancer BL	Lung Cancer CF	Disabling BID BL	Disabling BID CF	Non-Disabling BID BL	Non-Disabling BID CF	Pleural Injury BL	Pleural Injury CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	408	18	34	50	71	41	51
1997	852	757	601	607	1165	1190	1024	1070
1998	1408	1250	2386	2336	3823	3849	3811	3941
1999	2265	2011	16423	15811	24116	23988	8291	9007
2000	2960	2628	15359	14817	24575	24446	10674	11392
TOTAL	7945	7054	34787	33605	53729	53544	23841	25461
1992	14	12	1	1	0	1	0	0
1993	17	15	2	3	0	1	0	0
1994	555	493	6	26	3	30	0	11
1995	933	829	44	76	30	75	21	40
1996	1612	1431	1003	1019	3356	3373	3722	3825
1997	2405	2136	4262	4170	7262	7292	5453	5690
1998	2111	1875	3967	3876	6992	7008	5907	6129
1999	2653	2356	22284	21438	35603	35339	12023	13032
2000	3685	3272	20135	19418	30318	30187	13653	14560
TOTAL	13985	12419	51704	50027	83564	83306	40779	43287
CF - BL		1566		1677		258		

52614 1014

Claims_rR
R2_1

Harris Report 7 Replication
with R2 changed 3 to 1.0
and r2 changed 0.7 to 1.0

year	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
	BL	CF	BL	CF	BL	CF	BL	CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	435	18	26	50	60	41	46
1997	852	807	601	604	1165	1177	1024	1045
1998	1408	1333	2386	2364	3823	3836	3811	3871
1999	2265	2144	16423	16140	24116	24060	8291	8621
2000	2960	2802	15359	15109	24575	24519	10674	11005
TOTAL	7945	7521	34787	34243	53729	53652	23841	24588
1992	14	13	1	1	0	0	0	0
1993	17	16	2	2	0	0	0	0
1994	555	525	6	16	3	16	0	5
1995	933	883	44	60	30	51	21	30
1996	1612	1526	1003	1012	3356	3365	3722	3769
1997	2405	2277	4262	4221	7262	7278	5453	5562
1998	2111	1998	3967	3926	6992	7001	5907	6009
1999	2653	2512	22204	21892	35603	35485	12023	12489
2000	3685	3489	[illegible]	19804	30318	30262	13653	14072
TOTAL	13985	13239	51704	50934	83564	83458	40779	41936
CF - BL		746		770		106		

Claims_rR
R2_r2_1

52614 1015

Harris Report 7 Replication
with R2 changed 3 to 1.0
and r2 changed 0.7 to 1.0
and R1 changed 1.5 to 1.0

	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
year	BL	CF	BL	CF	BL	CF	BL	CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	450	18	21	50	54	41	43
1997	852	834	601	602	1165	1170	1024	1032
1998	1408	1378	2386	2377	3823	3828	3811	3834
1999	2265	2217	16423	16312	24116	24096	8291	8420
2000	2960	2898	15359	15261	24575	24555	10674	10803
TOTAL	7945	7777	34787	34573	53729	53703	23841	24132
1992	14	14	1	1	0	0	0	0
1993	17	17	2	2	0	0	0	0
1994	555	543	6	10	3	8	0	2
1995	933	913	44	50	30	38	21	24
1996	1612	1578	[illegible]	1007	3356	3360	3722	3740
1997	2405	2354	4262	4246	7262	7269	5453	5496
1998	2111	2067	3967	3951	6992	6996	5907	5947
1999	2653	2597	22264	22131	35603	35559	12023	12205
2000	3685	3608	[illegible]	20006	30318	30298	13653	13816
TOTAL	13985	13691	51704	51404	83564	83528	40779	41230
CF - BL		294		300		36		

52614 1016

Claims_rR
R2_r2_R1_1

Harris Report 7 Replication
with R2 changed 3 to 1.0
and r2 changed 0.7 to 1.0
and R1 changed 1.5 to 1.0
and r1 changed 0.9 to 1.0

year	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
	BL	CF	BL	CF	BL	CF	BL	CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	460	18	18	50	50	41	41
1997	852	852	601	601	1165	1165	1024	1024
1998	1408	1408	2386	2386	3823	3823	3811	3811
1999	2265	2265	16423	16423	24116	24116	8291	8291
2000	2960	2960	15359	15359	24575	24575	10674	10674
TOTAL	7945	7945	34787	34787	53729	53729	23841	23841
1992	14	14	1	1	0	0	0	0
1993	17	17	2	2	0	0	0	0
1994	555	555	6	6	3	3	0	0
1995	933	933	44	44	30	30	21	21
1996	1612	1612	1003	1003	3356	3356	3722	3722
1997	2405	2405	4262	4262	7262	7262	5453	5453
1998	2111	2111	3967	3967	6992	6992	5907	5907
1999	2653	2653	22284	22284	35603	35603	12023	12023
2000	3685	3685	20135	20135	30318	30318	13653	13653
TOTAL	13985	13985	51704	51704	83564	83564	40779	40779
CF - BL		0		0		0		

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Claims_rR
R2_r2_R1_r1_1

Harris 5
9/28/00

JEFFREY E. HARRIS MD PHD
52 HEDGE ROAD
BROOKLINE MA 02445-7551
(617) 277-1024

September 27, 2000

Laurie S. Dix
Orrick Herrington & Sutcliffe LLP
666 Fifth Avenue
New York NY 10103-0001

RE: Falise, et al. v. American Tobacco Co., et al.

Dear Ms. Dix:

At your request, I am attaching charts that display the numbers of claims by year and diagnosis in the baseline and median counterfactual scenarios.

I generated the charts by running the programs *dm5* and *dm6*, with the modification that input file *ms8a* replaced *ms7a*. The files *dm5.do, dm6.do* and *ms7a.dta* were previously provided in *Harris Manville Trust Report 6.zip* on June 14, 2000. The file *ms8a.dta* and supporting documentation was previously provided in *Harris HK Porter Report 1.zip* on August 23, 2000. As noted in my expert report in *HK Porter*, dated August 21, 2000, the file *ms8a.dta* was generated under the assumption of no post-2000 misconduct in order to comply with the Court's Daubert ruling. Although the attached tables show only the median counterfactual estimates, the ranges can also be readily computed from the above-noted, previously supplied programs and data.

Sincerely,

Jeffrey E. Harris

Jeffrey E. Harris

Enclosure

52614 1018

Wecker
EXHIBIT NO. 16
12-13-00
GINA GLANTZ

Table 1. Past Claims in the Baseline and Median Counterfactual Scenarios under RICO								
	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
Year	BL	CF	BL	CF	BL	CF	BL	CF
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	460	232	18	78	50	143	41	95
1997	852	429	601	587	1,165	1,252	1,024	1,278
1998	1,408	709	2,386	2,054	3,823	3,854	3,811	4,540
1999	2,265	1,140	16,423	13,102	24,116	23,044	8,291	12,334
2000	2,960	1,490	15,359	12,370	24,575	23,477	10,674	14,726

Table 2. Past Claims in the Baseline and Median Counterfactual Scenarios under SFA								
	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
Year	BL	CF	BL	CF	BL	CF	BL	CF
1992	14	7	1	3	0	3	0	2
1993	17	[illegible]	2	4	0	4	0	2
1994	555	279	6	82	3	122	0	59
1995	933	470	44	165	30	230	21	126
1996	1,612	[illegible]	1,003	1,006	3,356	3,349	3,722	4,293
1997	2,405	1,210	4,262	3,654	7,262	7,236	5,453	6,783
1998	2,111	1,062	3,967	3,383	6,992	6,909	5,907	7,153
1999	2,653	1,335	22,284	17,719	35,603	33,666	12,023	17,725
2000	3,685	[illegible]	20,135	16,190	30,318	29,095	13,653	18,773

Table 3. Future Claims in the Baseline and Median Counterfactual Scenarios under SFA and RICO								
	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
Year	BL	CF	BL	CF	BL	CF	BL	CF
2000	1,856	[illegible]	6,315	5,019	10,105	9,713	5,848	7,820
2001	1,836	837	6,248	4,965	9,997	9,609	5,782	7,733
2002	1,807	824	6,155	4,891	9,848	9,465	5,692	7,614
2003	1,773	809	6,042	4,801	9,667	9,291	5,583	7,470
2004	1,734	791	5,913	4,699	9,461	9,093	5,460	7,306
2005	1,692	771	5,774	4,588	9,238	8,878	5,327	7,129
2006	1,580	721	5,300	4,215	8,476	8,153	4,517	6,174
2007	1,486	678	4,920	3,916	7,865	7,570	3,911	5,451
2008	1,435	654	4,750	3,781	7,594	7,309	3,752	5,239
2009	1,381	630	4,573	3,639	7,309	7,035	3,586	5,018
2010	1,324	604	4,386	3,491	7,011	6,748	3,414	4,787
2011	1,265	577	4,192	3,337	6,700	6,449	3,237	4,549
2012	1,205	549	3,993	3,178	6,382	6,142	3,056	4,306
2013	1,142	521	3,790	3,016	6,056	5,828	2,873	4,059

Table 3 Continued. Future Claims in the Baseline and Median Counterfactual Scenarios under SFA and RICO

	Lung Cancer		Disabling BID		Non-Disabling BID		Pleural Injury	
Year	BL	CF	BL	CF	BL	CF	BL	CF
2014	1,080	492	3,584	2,852	5,726	5,511	2,690	3,811
2015	1,016	463	3,377	2,687	5,395	5,192	2,508	3,564
2016	954	435	3,171	2,524	5,066	4,875	2,328	3,320
2017	893	407	2,968	2,362	4,741	4,563	2,154	3,083
2018	832	379	2,769	2,203	4,422	4,256	1,985	2,851
2019	773	352	2,576	2,049	4,113	3,958	1,823	2,628
2020	716	326	2,388	1,900	3,813	3,669	1,668	2,415
2021	662	302	2,208	1,756	3,524	3,391	1,522	2,212
2022	608	277	2,035	1,619	3,247	3,125	1,383	2,019
2023	559	255	1,869	1,487	2,982	2,870	1,252	1,836
2024	510	233	1,710	1,360	2,728	2,625	1,128	1,663
2025	465	212	1,559	1,240	2,486	2,392	1,013	1,500
2026	421	192	1,414	1,125	2,256	2,170	904	1,346
2027	379	173	1,278	1,016	2,038	1,960	803	1,202
2028	341	156	1,150	915	1,834	1,764	711	1,070
2029	305	139	1,032	820	1,644	1,581	626	948
2030	272	124	922	733	1,468	1,413	550	837
2031	242	110	820	652	1,306	1,257	481	736
2032	214	97	726	577	1,157	1,113	417	644
2033	188	86	640	508	1,018	979	361	560
2034	163	74	558	443	889	854	308	482
2035	141	64	482	383	767	737	260	410
2036	119	54	411	326	653	628	217	344
2037	99	45	344	273	548	526	178	285
2038	82	37	284	226	452	435	143	231
2039	66	30	231	183	367	353	113	184
2040	52	24	184	146	293	281	88	145
2041	41	19	145	115	230	221	66	111
2042	31	14	112	89	178	171	50	84
2043	24	11	85	68	135	130	37	63
2044	17	8	65	51	102	98	27	47
2045	13	6	48	38	76	73	20	34
2046	9	4	36	28	56	54	14	25
2047	7	3	26	21	41	39	10	18
2048	5	2	19	15	30	29	7	12
2049	3	1	14	11	22	21	4	9

Harris Report 7 replication
no Pleural effect
using ms8a.lim, ms5lim.lpj

p_p

0.5033	0.0000	0.0000	0.0000
0.1397	0.7785	0.0000	0.0000
0.2139	0.1052	0.8638	0.0000

0.1046 0.0990 0.0904 1.000

R2_1

0.8880	0.0000	0.0000	0.0000
0.0365	0.9577	0.0000	0.0000
0.0482	0.0217	0.9754	0.0000
0.0195	0.0174	0.0160	1.0000

R2_r2_1

0.9467	0.0000	0.0000	0.0000
0.0177	0.9803	0.0000	0.0000
0.0229	0.0102	0.9886	0.0000
0.0090	0.0080	0.0074	1.0000

R2_r2_R1_1

0.9790	0.0000	0.0000	0.0000
0.0070	0.9923	0.0000	0.0000
0.0090	0.0040	0.9956	0.0000
0.0035	0.0031	0.0029	1.0000

R2_r2_R1_r1_1

1.0000	0.0000	0.0000	0.0000
0.0000	1.0000	0.0000	0.0000
0.0000	0.0000	1.0000	0.0000
0.0000	0.0000	0.0000	1.0000

rR_probs
probs

Supplement to Expert Witness Report

Prepared by: K. Michael Cummings, Ph.D., MPH

in reference to:

Falise, et al. v. The American Tobacco Company, et al.

September 22, 2000

1. Basis of Opinions

1.1 This supplemental report outlines my opinions on the subject of how blue collar workers responded to information and misinformation on smoking and how this information impacted smoking behavior (uptake and cessation). The term blue collar workers includes persons employed in following general occupational categories: precision production, craftsmen, repair occupations, machine operators, assemblers, inspectors, transportation and material moving occupations, handlers, equipment cleaners, helpers and laborers.[1]

1.2 The vast majority of the Manville Trust's claimants are male. Most are blue collar workers occupationally exposed to asbestos.[2]

1.3 The opinions stated in this report are based on my own personal research and years of professional experience in conducting prevention and stop smoking programs. In my 20 year research career, I have conducted several smoking cessation studies that have involved large numbers of blue collar smokers. In addition, as part of my duties in directing the Tobacco Control Program at Roswell Park Cancer Institute I have personally conducted dozens of lectures and stop smoking programs for thousands of blue collar employees located in the Western New York region. I have conducted programs for auto mechanics, truck drivers, auto workers, chemical factory workers, steel industry employees, warehouse workers, policemen and prison guards, and military personnel. Below is a partial listing of locations where I have conducted tobacco education programs for blue collar workers, some of whom were occupationally exposed to asbestos.

Buffalo China	General Motors Tonawanda Engine Plant
Mentholatum Company	New York State Department of Transportation
Rich Products	DuPont De Nemours EI & Company
Bethlehem Steel	Wyoming County Correctional Facility
Tops Supermarkets	United States Coast Guard
Buffalo Police Department	Niagara Falls Air Force Base

[1]Bureau of the Census Classified Index of Industries and Occupations. Appendix B. Occupational Classifications, 1990.

[2]Personal communication re: The Trust's Claims Population. August, 1999.

In addition, I have studied the scientific literature on smoking, smoking cessation, diseases related to smoking, addiction, cigarette design, and the history of medical knowledge related to smoking and consumer awareness and risk perceptions regarding smoking. I have also personally collected and reviewed thousands of tobacco industry documents. In addition, I have collected and reviewed cigarette advertisements and examples of cigarette product marketing. I have published and presented numerous scientific papers on the subject of cigarette product marketing, product design, consumer awareness and risk perceptions, tobacco use epidemiology, smoking cessation, and the impact of programs and methods to help people stop smoking.

1.4 Data from the Community Intervention Trial of Smoking Cessation (COMMIT) are included in this report since many of the participants in this study were blue collar workers.[3] The COMMIT study is the largest randomized community intervention study on smoking behavior ever undertaken. The study was funded by the National Cancer Institute. The COMMIT study involved assigning one community within each of 11 matched community pairs to receive a comprehensive educational intervention lasting four years while the other 11 communities served as an untreated control group. The study involved tracking the smoking behavior of over 20,000 smokers between 1988 and 1993. I was involved in the COMMIT study from its inception in 1986 when Roswell Park was selected as one of 11 participating research centers to plan and implement the study. I served as Chairman of the Design and Evaluation subcommittee for the study and therefore I am very familiar with the data collected as part of the study.

1.5 My expertise on these subjects has been acknowledged by others including those in the public health field who have called upon me to serve on expert committees, provide consultation on projects, and review grants, scientific manuscripts, and reports. I serve as the Deputy Editor for *Tobacco Control*, one of the leading scientific journals in the field.[4] I have received several awards for my community service and research on tobacco.

[3]COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT): summary of design and intervention. JNCI 1991, 83:1620-1628.

[4]http://tc.bmjjournals.com/misc/edboard.shtml

2. Summary list of opinions

2.1 The opinions express in this report are listed below. Subsequent sections of this report summarize the bases for these opinions.

- Blue collar workers start smoking earlier than white collar workers;
- When blue collar workers first start smoking they are not usually thinking about future consequences and health risks;
- Blue collar workers have a higher smoking prevalence rate, report smoking more cigarettes per day, and have more total pack years of exposure to cigarette smoke compared to workers in other occupational groups;
- Blue collar workers have been deliberately exposed to cigarette advertising and promotions;
- The majority of blue collar smokers express the desire to stop smoking but fail more often in efforts to stop smoking compared to workers in other occupational groups;
- Compared to persons in other occupational groups blue collar workers are more likely to be misinformed about the health risks of cigarette smoking and the health benefits gained from quitting smoking;
- Beliefs about the health risks of smoking and benefits of stopping smoking are predictive of smoking behavior in blue collar smokers;
- Cigarette companies have never informed blue collar workers about the risks of smoking; and
- Educating blue collar workers about the health risks of smoking and benefits of smoking cessation influences smoking behavior.

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2. **Blue collar workers report starting smoking earlier than white collar workers**

2.1 Data from the 1997 National Health Interview Survey [NHIS] show that among both adult (18 and older) current and former smokers proportionately more blue collar workers reported smoking regularly at earlier ages than did white collar workers.[5] Among blue collar workers, 31.2% reported smoking regularly before age 16 and 57.9% reported starting smoking regularly by age 18 years. Data collected as part of the COMMIT baseline survey in 1988 found similar results, i.e., the majority of blue collar smokers report beginning their smoking careers as teenagers and compared to other occupations, blue collar workers tend to begin smoking regularly at earlier ages.[6]

Occupational Group	<=15 yrs %	16-19 yrs %	>=20yrs %
Blue Collar (n=4586)	31	48	21
Professional (n=3753)	19	50	31
Clerical/sales (n=3182)	21	50	29

2.2 The Institute of Medicine Report (IOM) on nicotine addiction and youth reported that those who become addicted to tobacco at a younger age are the most likely to remain addicted and eventually experience health problems attributable to their use of tobacco products.[7]

3. **When blue collar workers first start smoking they are not usually thinking about future consequences and health risks**

3.1 The 1994 IOM report noted that decisions to engage in risky behaviors, like cigarette smoking, often "reflect a distinctive focus on short-term benefits and an accompanying tendency to discount long-term risks or dangers, and to believe that those risks can be controlled by personal choice."[8] According to the IOM report, the issue is not one of general knowledge (i.e., smoking is linked to lung cancer), but the difficulty that many

[5] Giovino GA, Pederson LL, Trosclair A. The prevalence of selected cigarette smoking behavior by occupational class in the United States. Draft report 7/20/00.

[6] COMMIT 1988 Baseline Survey.

[7] Lynch BS, Bonnie RJ. Growing Up Tobacco Free. Washington, D.C.: National Academy Press, 1994.

[8] Lynch BS, Bonnie RJ. Growing Up Tobacco Free. Washington, D.C.: National Academy Press, 1994.

52614 1026

people have envisioning long-term consequences and appreciating the personal relevance of these consequences.[9] Paul Slovic in his research on adolescent risk assessment of smoking found that a "high percentage of adolescent smokers see no health risk from smoking the next cigarette or from smoking regularly for a few years."[10]

3.2 Slovic also has found that the majority of adult smokers responded *"not at all"* when asked: *"When you first started to smoke, how much did you think about how smoking might affect your health?"*[11] When asked: *"When you first started smoking, did you think more about how smoking would affect your future health or about how you were trying something new?"*, the majority of smokers responded *"thought about trying something new and exciting."*[12] Thus, it appears that many people believe they can escape the harmful consequences of smoking by stopping before health problems emerge. It is common for smokers to tell me that *"I'm just smoking for the fun of it, I can quit anytime I want,"* or *"I will stop smoking in a few years before I suffer any ill effects."*

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[9] Lynch BS, Bonnie RJ. Growing Up Tobacco Free. Washington, D.C.: National Academy Press, 1994.

[10] Slovic P. What does it mean to know a cumulative risk? Adolescents' perceptions of short-term and long term consequences of smoking. Journal of Behavioral Decision Making, 2000, 13:259-266.

[11] Slovic P. Rational actors and rational fools: The influence of affect on judgement and decision making. Paper prepared for the Symposium on The Implications of Psychology for Product Liability held at Roger Williams University School of Law, Bristol, Rhode Island, April 21, 2000.

[12] Slovic P. Rational actors and rational fools: The influence of affect on judgement and decision making. Paper prepared for the Symposium on The Implications of Psychology for Product Liability held at Roger Williams University School of Law, Bristol, Rhode Island, April 21, 2000.

3.3 When a persons just begins smoking they do not necessarily think about how long they will be smoking.[13] Current smokers in the University of Michigan's longitudinal tracking study of high school seniors were asked: *"Do you think you will be smoking cigarettes five years from now?"* Among respondents who were occasional smokers (i.e., less than one cigarette per day), 85% predicted that they probably or definitely would not be smoking in five years, as did 32% of those who smoked one pack per day. However, in a follow-up study six years later of those who had smoked one pack per day, only 13% had quit and 70% still smoked one pack or more per day. Of those who smoked occasionally, 58% were no longer smoking, and 37% had actually increased their cigarette consumption.[14]

3.4 The majority of smokers say they would not start smoking again if they had to do over again.[15] Slovic found that 85% of adult smokers answered *"no"* to the question: *"Smoking: Would you start again?"* Regret about ever starting to smoking is expressed in a report for Imperial Tobacco Limited (affiliated with Brown & Williamson Tobacco Company) by Kwechansky Marketing Research, Inc., entitled: Project Plus/Minus which involved a careful analysis of the smoking attitudes and habits of teenagers. The report concludes:

> *"Starters no longer disbelieve the dangers of smoking, but they almost universally assume these risks will not apply to themselves because they will not become addicted. Once addiction does take place, it becomes necessary for the smoker to make peace with the accepted hazards. This is done by a wide range of rationalizations . . . The desire to quit seems to come earlier now than before, even prior to the end of high school. In fact, it often seems to take hold as soon as the recent starter admits to himself that he is hooked on smoking. However, the desire to quit, and actually carrying it out, are two quite different things, as*

[13]Slovic P. Rational actors and rational fools: The influence of affect on judgement and decision making. Paper prepared for the Symposium on The Implications of Psychology for Product Liability held at Roger Williams University School of Law, Bristol, Rhode Island, April 21, 2000.

[14]Lynch BS, Bonnie RJ. Growing Up Tobacco Free. Washington, D.C.: National Academy Press, 1994.

[15]Slovic P. Rational actors and rational fools: The influence of affect on judgement and decision making. Paper prepared for the Symposium on The Implications of Psychology for Product Liability held at Roger Williams University School of Law, Bristol, Rhode Island, April 21, 2000.

the would-be quitter soon learns."[16]

4. **Blue collar workers have a higher prevalence of smoking, report smoking more cigarettes per day, and have more total pack years of exposure to cigarette smoke compared to workers in other occupational groups**

4.1 Among different occupational groups, blue collar workers have the highest prevalence of smoking.[17,18] Among workers exposed to asbestos a higher percentage (80% to 90%) report a history of cigarette smoking.[19,20] Trend data show that the gap in smoking prevalence between blue collar and white collar workers has widened over the past 20 years. In 1978-80, blue collar workers were 38% more likely to smoke cigarettes than white collar workers; by 1997 blue collar workers were 75% more likely to smoke than white collar workers[21].

4.2 National surveys and the COMMIT study have found that blue collar smokers smoke more cigarettes per day compared to workers in other occupational groups.[22]

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[16]Kwechansky Marketing Research, Inc. Project Plus/Minus. Imperial Tobacco Limited. May 7, 1982. Bates Number: 566627751-566627824.

[17]Giovino GA, Pederson LL, Trosclair A. The prevalence of selected cigarette smoking behavior by occupational class in the United States. Draft report 7/20/00.

[18]Nelson DE, et al. Cigarette smoking prevalence by occupation in the United States. JOM 1994;36:516-525.

[19]For example, see March 3, 1985 Memo from Anthony Colucci to George Newton. Re: asbestos/smoking litigation. Bates 51583 8550.

[20]U.S. Department of Health and Human Services. The Health Consequences of Smoking: Cancer and Chronic Lung Disease in the Workplace. A Report of the Surgeon General. Rockville, Maryland: U.S. Department of Health and Human Services, Public Health Service, Office on Smoking and Health, DHHS (PHS) 85-50207, 1985.

[21]Giovino GA, Pederson LL, Trosclair A. The prevalence of selected cigarette smoking behavior by occupational class in the United States. Draft report 7/20/00.

[22]Giovino GA, Pederson LL, Trosclair A. The prevalence of selected cigarette smoking behavior by occupational class in the United States. Draft report 7/20/00.

Occupational Group	Cigarettes per day[23] <=14	15-24	>=25+
	%	%	%
Blue Collar (n=4581)	19	36	45
Professional (n=3750)	25	33	42
Clerical/sales (n=3179)	25	36	39

4.3 Blue collar workers report more total pack years of exposure to cigarette smoke compared to workers in other occupational groups because they: a) initiate smoking earlier, b) have higher prevalence of smoking (especially among males), c) smoke more cigarettes per day, and d) and are less likely to stop smoking.[24]

5. **Blue collar workers have been deliberately exposed to cigarette advertising and promotions**

5.1 Cigarette companies have spent billions of dollars to advertise and promote their brands over the past half century making cigarettes among the most heavily advertised consumer products sold in the United States.[25]

5.2 Cigarette advertising for the brands popular with blue collar smokers have sometimes used images of blue collar smokers and/or activities that have appeal to blue collar workers (e.g., auto-racing, motorcycles).[26] Tobacco companies maintained information on the lifestyle activities, purchasing habits (including magazines), and

[23]COMMIT 1988 Baseline Survey.

[24]U.S. Department of Health and Human Services. The Health Consequences of Smoking: Cancer and Chronic Lung Disease in the Workplace. A Report of the Surgeon General. Rockville, Maryland: U.S. Department of Health and Human Services, Public Health Service, Office on Smoking and Health, DHHS (PHS) 85-50207, 1985; also see: Giovino GA, Pederson LL, Trosclair A. The prevalence of selected cigarette smoking behavior by occupational class in the United States. Draft report 7/20/00; and Nelson DE, et al. Cigarette smoking prevalence by occupation in the United States. JOM 1994; 36:516-525.

[25]Federal Trade Commission Report to Congress For 1998.

[26]For examples see Pollay slide collection.

cigarette brand preferences of blue collar and white collar workers.[27 28 29] Cigarette companies have even considered developing new product names like "Union-Made" or "Union-Label" targeted to blue collar union members, union families and union sympathizers.[30]

5.3 Data from the COMMIT study show that blue collar smokers are more likely than smokers in other occupational groups to report smoking Marlboro, Winston, Camel, Kool and Newport as their usual brand.[31]

Brand	Blue Collar 1988 %	Blue Collar 1993 %	Professional 1988 %	Professional 1993 %	Clerical/sales 1988 %	Clerical/sales 1993 %
Marlboro	22.0	17.9	16.9	15.8	18.5	15.3
Winston	10.9	7.0	8.5	6.3	9.3	6.7
Camel	6.1	5.4	4.6	4.3	3.7	2.8
Kool	4.5	3.5	3.8	2.8	4.2	3.7
Newport	3.5	3.7	3.3	2.9	3.2	3.0

- Marlboro, Winston, Camel, Kool, and Newport have been among the most heavily advertised cigarette brands in the United States. These brands have also been found to be popular among younger, less educated, lower income smokers.[32 33 34 35]

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[27]PM USA. Retail direct marketing: cluster A Wal-Mart Stores, Inc., Knoxville Market Suburban white/blue collar. Bates 2042009711.

[28]Summary of media habits by smoker segments. Bates 501301701 1718.

[29]March 13, 1989 Letter from Flair Communications to RJR regarding premiums targeted at 21 to 26 year old blue-collar smokers. Bates: 50883 7308.

[30]For example see: September 14, 1984 Lorillard Memo from MH Burke to TH Mau entitled "New Product Idea" Bates 91613630.

[31]COMMIT 1988 Baseline Survey and 1993 Endpoint Cohort Survey.

[32]CDC. Comparison of the cigarette brand preferences of adult and teenaged smokers-United States, 1989, 10 US Communities, 1988 and 1990. JAMA, 267:1893-1894, 1992.

[33]Cummings KM, et al. Comparison of recent trends in adolescent and adult cigarette smoking behaviour and brand preferences. Tobacco Control. 1997: 6(suppl: 2):S31-S37. Also, Cummings

5.4 Tobacco company documents reveal interest in tracking the habits of blue collar workers and discussion of marketing strategies to appeal to blue collar smokers. For example, a series of Philip Morris memos discuss how prices increases might impact the smoking behavior of blue collar workers.[36] [37]

A 1977 document from R.J. Reynolds Tobacco Company compares smoker preferences and perceptions of Marlboro and Winston. The document points out that smokers want a cigarette that has excellent taste, has as much tar and nicotine as other brands, and has an image that is masculine, rugged, *blue collar*, and modern. On these points, the author notes that Marlboro surpasses Winston. The document recommends repositioning Winston King's to have a more rugged, blue collar image.[38]

A 1980 R.J. Reynolds' document discusses a strategy to reinvigorate sagging Camel cigarette sales. The author notes that Camel smokers are viewed as masculine, rugged, and independent, but can also be viewed as "downscale, older, and more conservative." The document recommends that Camel marketing efforts be positioned to target men 18-34, blue collar, but not too downscale.[39]

A series of mid-1980's RJR documents discuss a proposal for a blue collar volume program in Ohio that has as its objective increasing the volume of Winston and Salem among blue collar smokers. This objective was to be accomplished by extending the reach of intercept couponing to smaller blue collar industrialized markets, with an emphasis on reaching those missed by current distribution downtown and in-store.

KM, et al. Discrepancies in cigarette brand sales and adult market share: are new teen smokers filling the gap? Tobacco Control 1997: 6(suppl: 2):S38-S43.

[34]RJR. Less Educated: Today's Trend, Tomorrow's Market? Bates No. 504617181-7241.

[35]Burrows D. Younger Adult Smoker: Strategies and Opportunities. (2/29/84) Bates: 501928462-501929550; Minnesota Trial Exhibit #: 12579.

[36]For example see: July 12, 1982 Memo from Myron Johnston to Harry Daniel on the "Effect of an excise tax increase on Philip Morris Sales." Bates 2058122235.

[37]Memo from HP Long Jr. To SP Pollack. Blue collar disposable income - 1970 to 1986. Bates 2043655450.

[38]Brand Positioning Statement. (11/1/77) Bates: 501188894-501188903.

[39]Camel Family Positioning Statement. (2/27/80) Bates: 500555223-50055226.

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Intercept couponing at the following events were discussed: Winston sponsored events, state county, local fairs/festivals, auto shows, construction and industrial sites, flea markets, farmer markets, truck terminals, bowling leagues, wrestling matches, and softball tournaments.[40]

Since blue collar workers start smoking at an earlier age compared to those in other occupational groups, it is noteworthy that several of the cigarette companies acknowledge that their brands were popular with younger smokers.[41,42]

A series of memos on Lorillard's Harley-Davidson cigarette brand identifies the target audience as young adult males, blue collar with high school education.[44,45]

A 1985 Brown & Williamson document identifies blue collar young males as "prime prospects."[46]

A 1977 Brown and Williamson document discusses why the military market is important to B & W. The document states that the military is a large market for reaching adults 18-25, is the only market without recession, unemployment and pay cuts.[47]

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[40] RJR Blue Collar Ohio Test Proposal Bates 50566 3765, 50560 4269-4275. (Note that there are a series of documents that reference this program - see list of Falise documents previously submitted)

[41] Achey TL. Subject: Product Information. (8/30/78) Bates: 03537131-03537132. Minnesota Trial Exhibit #: 10195.

[42] Cigarette Brand Switching Studies. (Undated; estimated 1984) bates: 665076894-665076916.

[43] Johnston M. Subject: Young Smokers - Prevalence, Trends, Implications and Related Demographic Trends. (3/31/81) Bates:1000390803-1000390855; Minnesota Trial Exhibit #: 10339.

[44] Harley Davidson Cigarette Creative Development Brief. Bates: 91377032-91377034.

[45] Harley Davidson Package Design II. Conclusions and Implications. Bates: 88499872-88499876.

[46] Subject: Cutter Tapes. (4/8/85) Bates:528010724-528010726.

[47] Nat Kornfield. Re: Military Market Importance to B&W Cigarette Sales.(9/7/77) Bates:680085619-680085620.

5.5 In the 1980's and 1990's branded discount and generic cigarettes were introduced into the marketplace. Research studies have established that changes (either up or down) in the price of cigarette can influence consumption.[48] This effect is more pronounced in young people and in those population groups with less disposal income. During the 1980's, Philip Morris was tracking the disposal income of blue collar workers and found that it was declining and very much tied to trends in employment.[49] Data from the COMMIT study show that blue collar smokers were more likely than smokers in other occupational groups to smoke generic cigarettes.[50]

Brand	Blue Collar		Professional		Clerical/sales	
	1988	1993	1988	1993	1988	1993
	%	%	%	%	%	%
Generic	6.3	15.0	4.7	11.2	5.5	12.8

In the COMMIT study use of discount and generic cigarettes was associated with lower household and higher daily cigarette consumption, and residence in an area with higher average cigarette prices.[51] All three of these characteristics (i.e., lower average incomes, heavier smokers, and residence in the Northeast where cigarette prices are higher because of taxes) are more common among blue collar workers. This study also found that respondents using discount or generic cigarettes were less likely to stop smoking or to reduce cigarette consumption between 1988 and 1993 compared with those who continued to use premium brand cigarettes.[52] Thus, the marketing strategy of offering discount and generic cigarettes made smoking more affordable which in turn helped the cigarette companies retain customers sensitive to price increases who might have otherwise reduced consumption or stop smoking altogether.

[48]National Cancer Institute. The impact of cigarette excise taxes on smoking among children and adults: summary report of a National Cancer Institute Expert Panel. Bethesda, Maryland: National Cancer Institute, 1993.

[49]Memo from HP Long Jr. To SP Pollack. Blue collar desposable income - 1970 to 1986. Bates 2043655450.

[50]COMMIT 1988 Baseline Survey and 1993 Endpoint Cohort Survey.

[51]Cummings KM, et al. Use of discount cigarettes by smokers in 20 communities in the United States, 1988-1993. Tobacco Control. 1997: 6(suppl: 2):S25-S30.

[52]Cummings KM, et al. Use of discount cigarettes by smokers in 20 communities in the United States, 1988-1993. Tobacco Control. 1997: 6(suppl: 2):S25-S30.

5.6 Since blue collar workers smoke the brands that are the most heavily advertised and brands which have been advertised to them as a group, one can conclude that the advertising has had an impact on the cigarette brand choices of blue collar smokers.[53]

6. The majority of blue collar smokers express the desire to stop smoking but fail more often in efforts to stop smoking compared to workers in other occupational groups

6.1 The 1988 COMMIT survey shows that the 65% of blue collar smokers express some desire to stop smoking.[54]

Occupational Group	Desire to stop smoking: not at all/a little	Desire to stop smoking: Somewhat/ a lot
	%	%
Blue Collar (n=4542)	35	65
Professional (n=3734)	30	70
Clerical/sales (n=3166)	31	69

6.2 Between 1988 and 1993, 75% of blue collar smokers in the COMMIT study reported making at least one serious attempt to stop smoking. However, compared to smokers in other occupational groups, blue collar smokers were less successful in stopping smoking.[55]

Occupational Group	% quit
	%
Blue Collar (n=4586)	22.7
Professional (n=3753)	26.2
Clerical/sales (n=3182)	24.2

6.3 In the COMMIT study most blue collar smokers reported a desire to stop smoking when surveyed in 1988, 3 out of 4 reported making at least one serious attempt to

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[53]U.S. Department of Health and Human Services. Reducing the Health Consequences of Smoking: 25 Years of Progress. Rockville, Maryland: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS (CDC)89-8411, 1989.

[54]COMMIT 1988 Baseline Survey.

[55]COMMIT 1993 Endpoint Cohort Survey.

stop smoking between 1988 and 1993, but only 30% of those who attempted to stop smoking were successful in stopping smoking over a five year period.[56] As a group, blue collar workers are less successful in stopping smoking because they initiate smoking at an earlier age and smoke more per day compared to persons in other occupational groups.[57]

7. **Compared to persons in other occupational groups blue collar workers are more likely to be misinformed about the health risks of cigarette smoking and the health benefits gained from quitting smoking**

7.1 Data from the 1989 COMMIT Evaluation Survey which assessed smoker's attitudes and beliefs about the health risks of smoking reveal that many smokers were misinformed about the relative health risks of cigarettes compared to other exposures (i.e., air pollution, alcohol, cocaine, being 20 pounds overweight). Blue collar smokers were more likely that smokers in other occupational groups to be misinformed about the risks of cigarette smoking.[58]

	Air pollution more harmful than cigarettes	
Occupational Group	Agree	Disagree
	%	%
Blue Collar (n=1278)	67	33
Professional (n=1053)	63	37
Clerical/sales (n=842)	67	33

	Cigarettes less harmful than alcohol	
Occupational Group	Agree	Disagree
	%	%
Blue Collar (n=1205)	47	53
Professional (n=983)	41	59
Clerical/sales (n=802)	45	55

[56]Hymowitz N, et al. Predictors of smoking cessation in a cohort of adult smokers followed for five years. Tobacco Control. 1997: 6(suppl: 2):S57-S62. Also see COMMIT 1993 Endpoint Cohort Survey.

[57]U.S. Department of Health and Human Services. The Health Consequences of Smoking: Cancer and Chronic Lung Disease in the Workplace. A Report of the Surgeon General. Rockville, Maryland: U.S. Department of Health and Human Services, Public Health Service, Office on Smoking and Health, DHHS (PHS) 85-50207, 1985.

[58]COMMIT 1989 Evaluation Cohort Survey.

Occupational Group	More people die from cigarettes than cocaine	
	Agree	Disagree
	%	%
Blue Collar (n=1161)	44	56
Professional (n=938)	54	46
Clerical/sales (n=782)	48	52

Occupational Group	Cigarette smoking is more harmful than >20lbs overweight	
	Agree	Disagree
	%	%
Blue Collar (n=1216)	34	66
Professional (n=1008)	32	68
Clerical/sales (n=831)	33	67

72 Data from the 1989 COMMIT Evaluation Survey reveal that blue collar smokers were more likely to express pessimism about the benefits of stopping smoking compared to smokers in other occupational categories.[59]

Occupational Group	There is little benefit from quitting smoking if a persons has smoked for >20 +years	
	Agree	Disagree
	%	%
Blue Collar (n=1285)	22	78
Professional (n=1096)	11	89
Clerical/sales (n=877)	11	89

Occupational Group	Quitting will help me avoid serious health problems	
	Likely/very likely	unlikely/very unlikely
	%	%
Blue Collar (n=1205)	80	20
Professional (n=991)	85	15
Clerical/sales (n=797)	84	16

[59]COMMIT 1989 Evaluation Cohort Survey.

8. **Beliefs about the health risks of smoking and benefits of stopping smoking are predictive of smoking behavior in blue collar smokers**

8.1 The Health Belief Model predicts that behavior change is more likely to occur in persons who perceive themselves to be susceptible to illness and believe that their susceptibility can be reduced by changing their behavior at a tolerable cost.[60]

8.2 A 1959 Roper Poll conducted for Philip Morris found that while many smokers perceived cigarettes as *"bad for you"*, there was *"surprising little concern about the health aspects of cigarettes."*[61] According to the Roper report, concern about health *"seems directed at the avoidance of throat irritation and the consequent search for mildness which seems to be a major asset of filters."*[62] Beliefs about smoking as a cause of lung cancer have changed over time.[63] According to the Gallup Organization, in January 1954, 41% of people answered *"yes"* to the question *"Do you think cigarette smoking is one of the causes of lung cancer, or not?"* In September, 1999, 92% of people answered *"yes"* to this same question.[64] Eighty eight percent of blue collar smokers who reported making a quit attempt in the COMMIT study cited concern for health or future health as a reason for attempting to stop smoking. Despite the fact that nearly all smokers acknowledge today that smoking is a cause of lung disease, many optimistically believe that their personal risk of illness is no greater than average.[65] This optimistic bias appears to be especially strong for heavy smokers who over-estimated the odds that they would survive to age

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[60] Rosenstock IM. The Health Belief Model: explaining health behavior through expectancies. In: Health Behavior and Health Education, 1990, pp. 39-62.

[61] Elmo Roper and Associates. Volume 1: A study of attitudes toward cigarette smoking and different types of cigarettes. January 1959.

[62] Elmo Roper and Associates. Volume 1: A study of attitudes toward cigarette smoking and different types of cigarettes. January 1959.

[63] Moore DE. Nine of ten Americans view smoking as harmful. Gallup Organization, October 7, 1999.

[64] Moore DE. Nine of ten Americans view smoking as harmful. Gallup Organization, October 7, 1999.

[65] Ayanian JZ, Cleary PD. Perceived risks of heart disease and cancer among cigarette smokers. JAMA 1999;281:1019-1021.

75.[66]

8.3 Between 1950 and 1980, many blue collar workers switched from unfiltered to filtered cigarettes under the belief that smoking a filtered cigarette is safer. The filtered cigarette was not a dominant factor in the market place before the 1950's.[67] By 1983, approximately 95% of the cigarettes sold in the United States contained filtered. The Federal Trade Commission report indicated that 98% of cigarettes sold in the United States in 1998 were filtered cigarettes.[68]

8.4 According to a 1959 Roper Poll conducted for Philip Morris, 54% of filtered cigarette smokers disagreed with the statement: *"Filtered tip cigarettes are no safer than non-filtered."*[69] Remarkably this percentage has actually increased over the past 40 years. A convenience sample of current and former smokers interviewed at the Division of Motor Vehicles in Erie County, New York during the summer of 1997 found that 58% expressed the belief that filtered cigarettes were safer than unfiltered cigarettes.[70]

8.5 My experience in working with thousands of smokers coupled with my review of the scientific literature on consumer perceptions about cigarettes suggests to me that many blue collar smokers are unaware that when they switch from a unfiltered to a filtered cigarette or from a high tar and nicotine content cigarette to one that is lower in tar and nicotine this does not necessarily reduce their exposure to the harmful constituents found in tobacco smoke.[71] One of the main design features of cigarettes used to lower

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[66] Schoebaum M. Do smokers understand the mortality effects of smoking? Evidence from the Health and Retirement Survey. AJPH 1997; 87:755-759.

[67] Hoffmann D., Hoffmann I. 1997. The changing cigarette, 1950-1995. Journal of Toxicology and Environmental Health 50:307-364.

[68] Federal Trade Commission Report to Congress for 1998 pursuant to the Federal Cigarette Labeling and Advertising Act. 2000.

[69] Elmo Roper and Associates. Volume 1: A study of attitudes toward cigarette smoking and different types of cigarettes. January 1959.

[70] Hastrup J, et al. Consumers beliefs about the safety of filters. Unpublished, 2000.

[71] Djordjevic M, Stellman SD, Zang E. Doses of nicotine and lung carcinogens delivered to cigarette smokers. JNCI 2000; 92:106-111.

tar and nicotine yields is vent holes in the filter.[72] Many smokers are unaware that the presence of these vent holes and unknowingly block them during smoking, thus increasing exposure to the toxins in cigarette smoke.[73] I have also found that most smokers are unaware of the problem of filter contaminants coming loose and being ingested and/or inhaled by the smoker during the act of smoking.[74 75 76 77 78 79]

8.6 Despite overwhelming evidence about the harmful effects of smoking, many smokers I speak with rationalize their smoking behavior by telling me that they will stop smoking before they experience any harmful consequences. Slovic found among adults who had been smoking for more than 5 years, 64% planned to stop smoking in the next year.[80] However, the reality is the majority of smokers who attempt to stop will relapse back to smoking.[81] This is more likely to be the case for blue collar smokers

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[72] Hoffmann D., Hoffmann I. 1997. The changing cigarette, 1950-1995. Journal of Toxicology and Environmental Health 50:307-364.

[73] Kozlowski L et al. Few smokers know their own cigarettes have filter vents. AJPH. 1998;88:861-682.

[74] Pauly J, et al. Fibers released from cigarette filters: an additional health risk to the smoker? Cancer Research 1995; 55:253-258.

[75] Pauly J et al. Inhaled cellulosic and plastic fibers found in human lung tissue. Cancer Epidemiology, Biomarkers & Prevention. 1998; 7:419-428.

[76] Pauly J, et al. Release of carbon granules from cigarettes with charcoal filters. Tobacco Control. 1997; 6: 33-40.

[77] Farr WK, Revere A. Examination of whole cigarette smoke by light and electron microscopy. New York: The Life Extension Foundation, 1958; pp1-109.

[78] Chehab F., et al. Method of and apparatus for decontamination the exposed surfaces of filter mouthpieces in smokers' products. US Patent number 5,645,087, July 8, 1997.

[79] Hastrup J, et al. Consumers beliefs about the safety of filters. Unpublished, 2000.

[80] Slovic P. Rational actors and rational fools: The influence of affect on judgement and decision making. Paper prepared for the Symposium on The Implications of Psychology for Product Liability held at Roger Williams University School of Law, Bristol, Rhode Island, April 21, 2000.

[81] Hymowitz N, et al. Predictors of smoking cessation in a cohort of adult smokers followed for five years. Tobacco Control. 1997: 6(suppl: 2):S57-S62.

compared to smokers in other occupational groups because blue collar smokers smoke more heavily and thus have a more difficult time stopping smoking permanently.

8.7 A second rationalization for continued smoking I commonly hear expressed by smokers is that *"other things are just as likely (or even more likely) to cause health problems, so why bother to stop smoking."* This fatalistic view of avoiding health problems by stopping smoking is more common among blue collar workers who often feel their occupational exposures make it unlikely that they will gain any health advantage by giving up smoking.[82]

8.8 A third rationalization I commonly hear expressed, especially by long term heavy smokers, is that there is no benefit to be gained after years of smoking. Of course, this rationalization is untrue. In fact, because the risk of illness from smoking is greater in heavy smokers the risk reduction benefits of smoking cessation would be expected to be greater for this group.

8.9 A fourth rationalization I frequently hear from smokers is: *"If cigarette smoking were as bad as they say, the government would ban them."* Thus, the observation that cigarettes are widely available helps smokers rationalize that the health risks can't be too great.

9. Cigarette companies have failed to informed blue collar workers about the risks of smoking.

9.1 Cigarette brand advertising and marketing has not informed blue collar smokers that cigarettes are addictive and can cause lung disease.[83] Cigarette companies were aware of research studies showing the joint effect of smoking and asbestos on lung cancer death rates.[84] Cigarette companies have never informed blue collar smokers that because of possible occupational exposure to asbestos or other workplace hazards

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[82]Fingerhut Grandados Opinion Research. Report on the findings of the occupational safety and health survey conducted on asbestos-related cancer. March 21, 1983

[83]For examples see Pollay slide collection.

[84]For example see: June 8, 1979 Memo from Fed Panzer to Horace Kornegay. Asbestos situation report. Bates: TIMIN 0067100. Also, see: July 12, 1980 report by PH Lee entitled Asbestos and Cigarette Smoking: A Review of two recent papers by Hammond, Selikoff, and Seidman. Bates: 2060545140.

they are at higher risk of developing lung disease because of their smoking.[85]

9.2 Cigarette companies had the ability to direct educational messages about the joint effects of smoking and asbestos on lung disease to asbestos exposed workers as evidenced by their ability to direct cigarette brand advertising to different segments of the population including blue collar workers.[86]

9.3 Not only have cigarette companies not informed blue collar workers about the health risks of smoking, they have publicly denied that cigarette smoking is a cause of lung disease while at the same time making claims that cigarette smoking is not injurious to health. For example, the "Frank Statement" advertisement published jointly by major cigarette manufacturers in hundreds of U.S. newspapers in 1954 stated:

"We believe the products we make are not injurious to health." [87]

In 1954, George Weissman, Vice-President of Philip Morris, stated that:

"If we had any thought or knowledge that in any way we were selling a product harmful to consumers, we would stop business tomorrow." [88]

A similar reassuring statement was issued by Lorillard in 1954:

"We believe Lorillard products are not injurious to any one's health, but we accept as an inherent responsibility our responsibility of our corporate citizenship the obligation to make the public's health our business." [89]

A 1963 letter to an elementary school teacher from RJR declared that: "*.... medical*

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[85] I have found no evidence among the thousands of tobacco industry documents that I have reviewed that demonstrate that cigarette manufacturers ever informed claimants of the Mansville Trust about the risks of smoking and increased risk of smoking and asbestos exposure.

[86] See section 5 of this report.

[87] The Frank Statement to Cigarette Smokers. Bates 03046592.

[88] Weissman G. Public relations and cigarette marketing. March 30, 1954 Bates 002366396-002366402. Also see: Weissman G. Facts versus Fancy. February 26, 1954 Bates: 002366389-002366397.

[89] P. Lorillard Company Annual Report, 1953. 93224668.

science has been unable to establish that smoking has a direct causal link with any human disease."[90] Nearly the identical statement can be found in similar letter to a 4th grade school teacher in 1972: *".... medical science has not found any conclusive evidence that an element in tobacco or tobacco smoke causes any human disease"*[91], and to an elementary school principal in 1990: *"....the simple and unfortunate fact is that scientists do not know the cause or causes of the chronic diseases reported to be associated with smoking."*[92] A 1969 advertisement from American Tobacco Company responding to a news article about the health risks of cigarette smoking assured consumers that as far as the American Tobacco Company was concerned:

"No scientist has produced clinical or biological proof that cigarettes cause the diseases they are accused of causing....we are not going to knuckle under to the Times [New York Times] or anyone else who tries to force us to accept a theory which, in the opinion of men who should know, is half-baked."[93]

In a 1972 Wall Street Journal article, James Bowling, VP for Philip Morris was quoted as saying...:

"If our product is harmful...we'll stop making it. We now know enough that we can take anything out of our product, but we don't know what ingredients to take out."[94]

A 1978 pamphlet from Philip Morris states:

"Cigarettes have never been proven to be unsafe."[95]

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[90]Mann JB. 5/1/63. Bates: 9445.

[91]Cahill TK. 4/7/72. Bates 5006701.

[92]Spach JF. 1/11/90. Bates:2599.

[93]Advertisement in the New York Times entitled, "Why We're Dropping the New York Times" (9/8/69) Bates: ATX040303547-ATX040303550.

[94]Kwitny Jonathan. Defending the Weed: How embattled group uses tact, calculation to blunt its opposition. The Wall Street Journal, January 24, 1972 Bates: 50032 4162.

[95]Facts about Smoking Controversy. 1978; Bates: TIMN0055129-TIMN0055135.

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In 1984, an RJR advertisement said:

"It has been stated so often that smoking causes cancer, it's no wonder most people believe this is an established fact. But, in fact, it is nothing of the kind. The truth is that almost three decades of research have failed to produce scientific proof for this claim...in our opinion, the issue of smoking and lung cancer is not a closed case. It's an open controversy." [96]

On February 2, 1984, the chairman of the board of RJR make the following comments as part of a panel discussion on the Nightline Television program:

"It is not known whether cigarettes cause cancer."

"Despite all the research to date, there has been no causal link established [between smoking and emphysema].

"...as a matter of fact, there are studies that while we are accused of being associated with heart disease, there have been studies conducted over ten years that would say, again, that science is still puzzled over these forces." [97]

10 Educating blue collar workers about the health risks of smoking and benefits of smoking cessation influences smoking behavior

10.1 Changes in both smoking initiation and smoking cessation over the past half century reflect the impact of increasing public awareness about the dangers of cigarette smoking.[98,99] Both smoking initiation rates and cessations rates have declined since the 1950's. However, changes in smoking behavior seen over the last half century have not been uniform among all occupational groups. Trend data show that the gap in smoking prevalence between blue collar and white collar works has widened over the past 20 years. In 1978-80, blue collar workers were 38% more likely to smoke cigarettes than white collar workers; by 1997 blue collar workers were 75% more

[96] Can we have an open debate about smoking? 1/30/84. Bates: TICT 0008934.

[97] ABC News. Nightline - EDB & Smoking Debates, February 2, 1984. Bates 20364.

[98] 1989 Surgeon General's Report on Smoking and Health.

[99] Warner KE. Effects of the anti-smoking campaign: An update. AJPH 1989; 79: 144-151.

likely to smoke than white collar workers.[100]

10.2 Access to information about the risks of smoking appears to key factor in explaining differences in smoking trends between occupational groups. For example, physicians have shown a marked decline in cigarette smoking prevalence over the last half century.[101] [102] [103] Physicians would be expected to have had much greater access to full and complete health information about the risks of cigarette smoking and the benefits of smoking cessation. The widening gap in cigarette smoking prevalence seen over the past 20 years between blue collar and white collar smokers is consistent with the observation that blue collar smokers are less well informed about the risks of smoking and benefits of smoking cessation.

10.3 Education programs that reduce the knowledge gap between white collar and blue collar workers can reduce differences in smoking behavior. The COMMIT study demonstrated that education about smoking can increase quit rates in a population.[104] The COMMIT education program was successful in significantly boosting quit rates by 1.8% overall. The COMMIT education program was found to be most effective in increasing cessation rates in those with less years of formal education (i.e., non-college graduates).[105]

10.5 My professional experience in working with thousands of smokers over the past 20 years coupled with findings of published research supports the view that smokers are

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[100] Giovino GA, Pederson LL, Trosclair A. The prevalence of selected cigarette smoking behavior by occupational class in the United States. Draft report 7/20/00.

[101] Nelson DE, et al. Trends in cigarette smoking among US physicians and nurses. JAMA, 1994; 271:1273-1275.

[102] Buechner JS, et al. Cigarette smoking behavior among Rhode Island Physicians, 1963-83. AJPH 1986; 76: 285-286.

[103] Garfinkel L Cigarette smoking among physicians and other health professionals, 1959-1972. CA-A Cancer Journal of Clinicians. 1976; 26:373-375.

[104] The COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT): I. Cohort results from a four year community intervention. AJPH 1995; 85:183-192.

[105] The COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT): I. Cohort results from a four year community intervention. AJPH 1995; 85:183-192.

interested in receiving information on the risks of smoking and benefits of smoking cessation and will respond to the provision of such information..[106 107 108 109 110 111 112 113 114]

10.6 As an expert in public health education and as someone who has designed and evaluated anti-smoking education campaigns for different target audiences, it is my opinion that the failure of cigarette companies to warn asbestos exposed workers about the increased risk of lung disease resulting from the joint effects of cigarette

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[106]Abt Associates. Independent Evaluation of the Massachusetts Tobacco Control Program: Fifth Annual Report: January 1994 to June 1998. Massachusetts Department of Public Health, 1999; also see: CDC. Cigarette smoking before and after an excise tax increase and anti-smoking campaign - Massachusetts 1990-1996. MMWR 1996; 45:960-970.

[107]Pierce et al. Tobacco Control in California: Who's Winning the War? An Evaluation of the Tobacco Control Program, 1989-1996. La Jolla, California: University of California, San Diego, 1998; also see: Pierce et al. Has the California tobacco control program reduced smoking? JAMA 1999;280:893-899.

[108]CDC. Best Practices for Comprehensive Tobacco Control Programs - August 1999. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, August 1999.

[109]U.S. Department of Health and Human Services. Reducing Tobacco Use: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2000.

[110]The COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT): I. Cohort results from a four year community intervention. AJPH 1995; 85:183-192.

[111]Kozlowski LT et al. Smoker reactions to a "radio message" that light cigarettes are as dangerous as regular cigarettes. Nicotine & Tobacco Research 1999; 1:67-76.

[112]Cummings KM, Sciandra R, Markello S. Impact of a newspaper mediated quit smoking program. AJPH 1987; 77:1452-1453.

[113]Cummings KM. Community-wide interventions for tobacco control. Nicotine & Tobacco Research 1999;1:S113-S116.

[114]Hastrup J, et al. Consumers beliefs about the safety of filters. Unpublished, 2000.

smoking and asbestos contributed to higher smoking rates, more frequent daily smoking, and lower rates of smoking cessation in this group of workers than would have otherwise been the case had these workers been warned about the joint risks of smoking and asbestos as a cause of lung disease.

K. Michael Cummings

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